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ABSTRACT

This publication, prepared by representatives from the Environmental Protection Agency, plant operations, vocational-technical schools, professional associations, and universities is the second of a two-volume series and contains guidelines which may be used in establishing a two-year or less post-secondary wastewater technology training program. Focusing on the posttraining performance desired of trainees, the guidelines are designed to provide practical, hands-on skill and knowledge directly related to the operation and management of a wastewater treatment plant. The guidelines consist of specific behavior sheets which are grouped according to seven general criterion behavior categories and contain a composite model plant process name and letter designation, specific process units, and stimulus and response detail. An introductory section describes the components of the behavior sheets and use of the guidelines. A process chart and specific process units for a composite model plant, stimulus and response detail for the general criterion behaviors, trainee characteristics and a glossary are appended. Volume I containing program guidelines is available as VT 016 376 in this issue. (SB)

ED 066576

CRITERIA FOR THE ESTABLISHMENT & MAINTENANCE OF TWO YEAR POST HIGH SCHOOL WASTEWATER TECHNOLOGY TRAINING PROGRAMS

VOLUME II

CEWT

CURRICULUM GUIDELINES

VT016377

ENVIRONMENTAL PROTECTION AGENCY
CLEMSON UNIVERSITY

NOTE TO READER

OF

VOLUME II: CURRICULUM GUIDELINES

CRITERIA FOR THE ESTABLISHMENT AND MAINTENANCE OF TWO YEAR POST HIGH SCHOOL WASTEWATER TECHNOLOGY TRAINING PROGRAMS

This document was produced specifically for use in establishing and evaluating curricula for two year post high school training programs funded by the Division of Manpower and Training, Water Quality Office, Environmental Protection Agency. The document is for limited distribution and for use by select persons who have received special training in the concepts and techniques employed. Although produced for a specific program, the curriculum guidelines offered can be invaluable in the design and evaluation of a variety of training programs and materials. Inquiry about how best to use this document should be addressed to the project director at Clemson University (see address pages iv and vii).

Revision of this document is probable; therefore, notice of errors (grammatical and technical) from the reader is welcomed. Current errata sheets will be provided periodically.

ED 066576

VOLUME II: CURRICULUM GUIDELINES

CRITERIA FOR THE ESTABLISHMENT AND MAINTENANCE OF TWO YEAR POST HIGH SCHOOL WASTEWATER TECHNOLOGY TRAINING PROGRAMS

ENVIRONMENTAL PROTECTION AGENCY

CLEMSON UNIVERSITY

1971

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John H. Austin
Project Director

Robert L. Reynolds
Principal Consultant

Supporting Staff:

Louis D. Eckley
Diane G. Haene
Barry W. Peterman
Wade H. Ponder

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Ronald A. Bryant
Assistant Superintendent
South River Water Pollution Control Plant
Atlanta, Georgia

Gerald A. Deal
Instructor
Unit Process Operators Training Course
Charles County Community College
La Plata, Maryland

William J. Hull
Foreman
Intrenchment Creek Water Pollution Control Plant
Atlanta, Georgia

Anthony J. Lauricha
Training Consultant
Bureau of Environmental Health
Utah State Division of Health
Salt Lake City, Utah

George J. Mason
Assistant Division Superintendent - Operations
Municipality of Metropolitan Seattle
Renton Division
Renton Treatment Plant
Renton, Washington

Douglas Rittman
Instructor, El Paso Public Schools
Operation Transition
Fort Bliss, Texas

Carl Schwing
Chairman
Pollution Abatement Technology Department
Charles County Community College
La Plata, Maryland

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Bernard J. Lukco, Program Specialist, Training Grants Branch, Division of Manpower and Training, Environmental Protection Agency

Joseph Bahnick, State and Local Manpower Development Branch, Environmental Protection Agency.

Representing plant operations were:

Anthony J. Lauricha, Training Consultant, Wastewater Training Division, Utah State Health Department, Salt Lake City, Utah

George J. Mason, Assistant Division Superintendent for Operations, Metro Renton Water Pollution Control Plant, Renton, Washington.

Representing the vocational/technical schools were:

Robert A. Ferguson, Director, Atlanta Area Technical Vocational School, Atlanta, Georgia

Carl Schwing, Chairman, Pollution Abatement Technology Department, Charles County Community College, La Plata, Maryland.

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John A. Voegtle, Director of Education and Training, Water Pollution Control Federation, Washington, D. C.

Heinz Russelman, Director, Wastewater Technology Program, National Sanitation Foundation, Ann Arbor, Michigan.

Representing instructional technology were:

Joseph C. Hammock, Professor, Psychology Department, University of Georgia, Athens, Georgia

Robert L. Reynolds, Consultant, Atlanta, Georgia

Virginia Zachert, Consultant, Good Hope, Georgia.

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PREFACE

Volume II: Curriculum Guidelines was designed for use as a part of the *Criteria for the Establishment and Maintenance of Two Year Post High School Wastewater Technology Training Programs*. Even so, the *Curriculum Guidelines* is relatively self-contained and may be used to establish a relevant wastewater technology program taking more or less than two years or to establish a more or less comprehensive program in terms of trainee competence.

The conscientious user will find *Curriculum Guidelines* a valuable tool in helping him to maintain a relevant focus in instructional development. However, it remains for the user, in consultation with the agency responsible for the development and implementation of the *Curriculum Guidelines*, to translate these guidelines into the more *specific* content and objectives of the day-to-day instructional program and to decide on the actual *methods* of instruction based on the *Curriculum Guidelines*.

The innovative concepts and approach used in the development of the *Curriculum Guidelines* were not employed at the expense of useful and practical documentation. The *extensive* involvement of *experienced plant personnel* in the design and development of *Curriculum Guidelines* ensured the production of a versatile, practical guide which can be used nationally in the development of quality programs for the training of efficient and effective wastewater treatment plant operators.

INTRODUCTION

The curriculum guidelines offered herein are "job performance" oriented rather than "subject matter" oriented. These guidelines will produce a curriculum which will assure that the program graduate will have practical, hands-on skill and knowledge directly related to the operation and management of a wastewater treatment plant.

The use of specific, definitive points of reference are required to produce objective and practical curriculum guidelines. Such points of reference are available in the observation, analysis, and documentation of the behavior of qualified men-on-the job, but such an ideal approach is impractical in terms of presently available resources. However, a functional simulation of the ideal is feasible and is offered herein in the form of a "Composite Model Plant" to represent the many different wastewater plants; "General Criterion Behavior" to represent the myriad of man-on-the-job behaviors sought; and "Posttraining Performance Evaluation Conditions and Criteria" to provide the standards by which to judge the adequacy of a trainee's skill and knowledge.

The COMPOSITE MODEL PLANT, GENERAL CRITERION BEHAVIOR, and POSTTRAINING PERFORMANCE EVALUATION CONDITIONS AND CRITERIA will be defined and explained in the section that follows. A careful *study* of these definitions and explanations, the related subconcepts and terminology, and the presentation format of the *Curriculum Guidelines* will facilitate the use of the guidelines and enhance the quality and effectiveness of the resulting curriculum.

DEFINITIONS

COMPOSITE MODEL PLANT

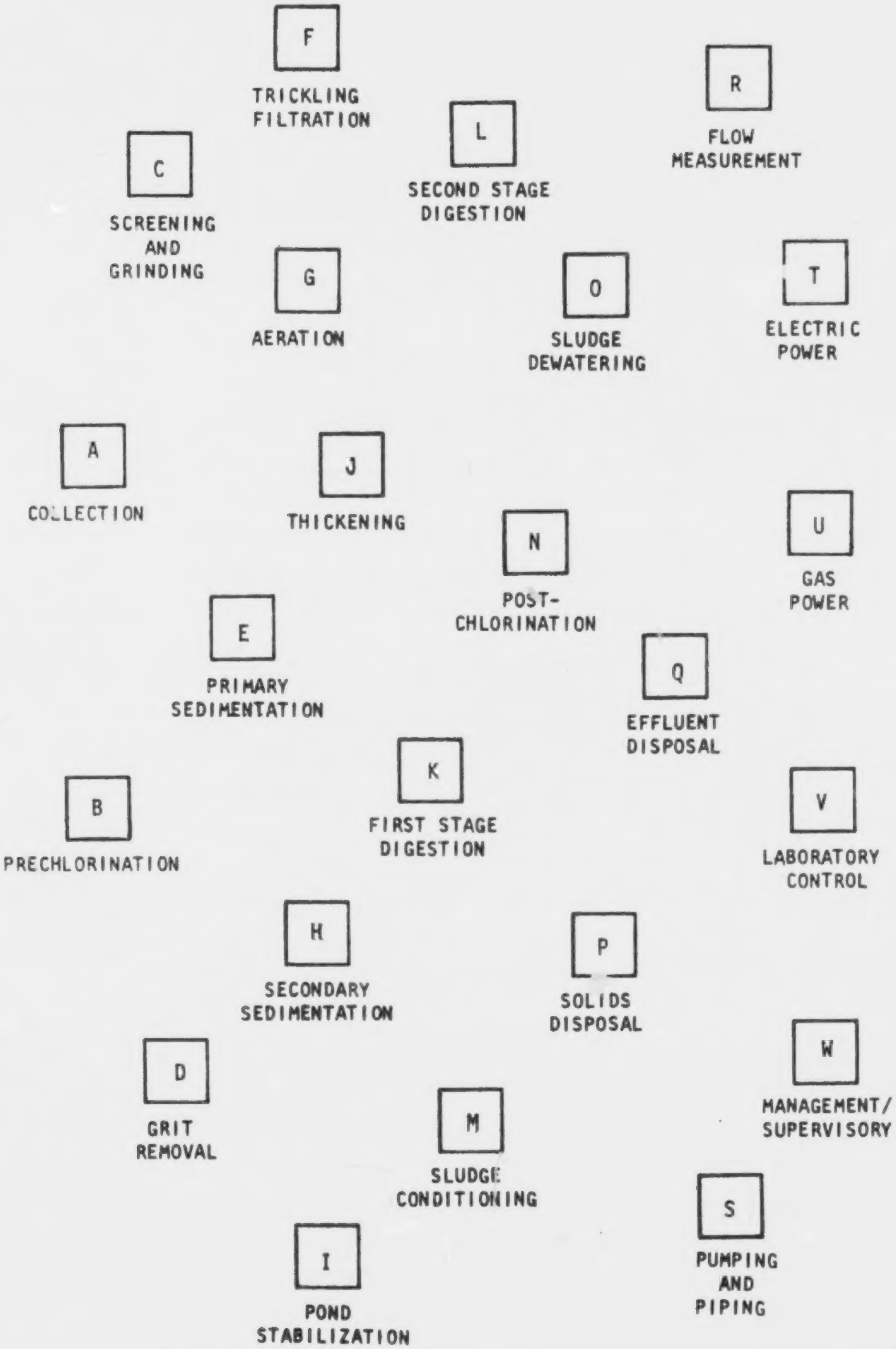
The Composite Model Plant (CMP) is one of two essential points of reference within the *Curriculum Guidelines.* The CMP is a representation of many wastewater treatment plants in one model. A summary of the CMP is seen in the PROCESSES CHART shown on the opposite page; a more detailed description of the CMP is provided by a number of sheets entitled SPECIFIC PROCESS UNITS (starting on page 561 in the Appendix).

PROCESSES CHART

As shown in the PROCESSES CHART on the opposite page, a letter of the alphabet identifies each treatment process represented in the CMP. The CMP is not to be construed as an actual plant but as a representation of many plants; it is a composite, or mix, of processes such as would seldom, if ever, occur in reality. However, if a trainee were to acquire competency in the operation and management of such a composite plant, there is high probability of his successfully transferring that competency to almost any plant currently in operation. The CMP provides the point of reference in deciding what specific skill and knowledge a trainee should acquire in order to have a practical and generalizable competence.

To more specifically identify the skill and knowledge sought, each process of the PROCESSES CHART is further defined by the specific units of equipment that are used to accomplish the indicated process. These units of equipment are described on the SPECIFIC PROCESS UNITS sheets.

PROCESSES CHART


F
TRICKLING FILTRATION
R
FLOW MEASUREMENT
L
SECOND STAGE DIGESTION
C
SCREENING AND GRINDING
G
AERATION
O
SLUDGE DEWATERING
T
ELECTRIC POWER
A
COLLECTION
J
THICKENING
N
POST-CHLORINATION
U
GAS POWER
E
PRIMARY SEDIMENTATION
Q
EFFLUENT DISPOSAL
K
FIRST STAGE DIGESTION
B
PRECHLORINATION
V
LABORATORY CONTROL
H
SECONDARY SEDIMENTATION
P
SOLIDS DISPOSAL
D
GRIT REMOVAL
W
MANAGEMENT/SUPERVISORY
M
SLUDGE CONDITIONING
S
PUMPING AND PIPING
I
POND STABILIZATION

SPECIFIC PROCESS UNITS SHEETS

The CMP is further defined on a number of sheets entitled SPECIFIC PROCESS UNITS. Such a sheet is shown in the EXAMPLE on the opposite page ⟶

> IMPORTANT:
>
> A "unit" is a specific piece of equipment, or a combination of equipment, that serves to accomplish one of the standard wastewater treatment plant processes listed on the PROCESSES CHART.

In the EXAMPLE , fourteen *distinct* units of equipment were identified as being used to accomplish the primary sedimentation process. (Of course, many more distinct units are possible by a regrouping of the characteristics made explicit and implied by the list.) Obviously, a *full* description of each of the process units listed would fill volumes; fortunately, a full description is *not* needed. Rather, for each of the fourteen possible units, one or more very distinct mechanical or functional characteristics of the unit is used to designate the *total* unit of equipment. For example . . .

> On the opposite page ⟶
> the brief description within the encircled line characterizes a *total* process unit used to accomplish the "E. PRIMARY SEDIMENTATION" process.

The CEWT's consulting panel of practicing wastewater plant operators* have certified that two or more technically qualified persons, when confronted with the brief description as noted, would visualize essentially the *same* total process unit. This common visualization of a *total, actual* process unit is exactly what is sought with the descriptions as listed.

The units listed on the SPECIFIC PROCESS UNITS sheets are grouped into "Principal" and "Other" catagories. "Principal Units" are those to be directly represented in the curriculum; "Other Units" are those only indirectly represented in the curriculum. Other Units which may be used in lieu of the Principal Unit when it is not available are called "Alternate Units". Other Units which can *not* be used in lieu of the Principal Unit when it is not available are called "Nonalternate Units". A full discussion of these distinctions follows.

---

* See ACKNOWLEDGEMENTS, page v.

EXAMPLE

E - CMP

SPECIFIC PROCESS UNITS
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

E. PRIMARY SEDIMENTATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Circular unit with telescopic valve draw off, density meter time clock, and trough with scraper

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Rectangular unit with sight glass, direct draw off, and trough with scraper
31. Rectangular unit with sight glass, direct draw off, and helical skimmer

.
.
.
.
.

39. Lagoon
40. Two story mechanical unit
41. Evacuator unit

(A full exposition of this example can be seen on page 570 in the Appendix.)

PRINCIPAL UNITS

The CEWT's panel of practicing operators were posed the following problem:

> You have been requested to find employment for a young man in a wastewater plant. He says that after 3-5 years working with the plant's primary sedimentation unit, he would like to be able to work effectively with most of the other units used to accomplish this process in other plants, with little or no additional formal instruction. To meet his desire, how would you describe the primary sedimentation unit of the plant within which you would place the employee?

The answer to the question provided the description of the *Principal Process Unit* as encircled in EXAMPLE I on the opposite page ⟶

The problem and question that provided the description of the Principal Unit also suggests what is meant by the statement: The Principal Unit will be *directly* represented in the curriculum. That is, with respect to the Principal Unit, the curriculum must be designed and implemented so as to ensure the same kind of practical, hands-on experience--skill and knowledge--a man would receive working with the actual process unit, in an actual plant. (Quality instruction in plant is assumed.)

> PLEASE NOTE: Experience with the Principal Unit does *not* ensure the absolute and unqualified transfer of skill and knowledge to *every* other possible unit accomplishing the same process--only the *best* transfer to the *most* such units. To provide the best *generalizable* skill and knowledge, a Principal Unit does *not* have to be the best or the most widely used of its class. Complexity and inclusiveness of operational behaviors are more important factors. Such coverage was achieved by identifying *one* Principal Unit per process--with one exception. To provide the minimum coverage desired for the various process units of Sludge Dewatering, it was necessary to identify *two* Principal Units as shown in EXAMPLE II ⟶

Units of equipment that are significantly related to a particular process but that do not qualify as Principal Units are included within the Other (Alternate or Nonalternate) classification.

EXAMPLE I

E - CMP

SPECIFIC PROCESS UNITS
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

E. PRIMARY SEDIMENTATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of*

EXAMPLE II

SPECIFIC PROCESS UNITS
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

CMP - O

O. SLUDGE DEWATERING

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Vacuum filter unit with cloth

11. Continuous feed centrifuge unit

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of*

OTHER UNITS

Other Units are those significantly related to a particular process and will be *indirectly* represented in the curriculum. The form that this indirect representation will take will be made more explicit later. Essentially, it will be a matter of ensuring that the trainee can relate Other Units to Principal Units *verbally*--being able to say how they are similar and/or different functionally and/or mechanically. (See General Criterion Behavior number 607, page 606, for a more precise statement.) Of course, eventually when a trainee is in an on-the-job context, he may be required, and should be able, to transfer his hands-on skill and knowledge as they relate to the Principal Unit to one or more of the Other Units with a minimum of additional on-the-job instruction.

ALTERNATE UNITS are Other Units that may be substituted for Principal Units when the latter are not available. In such a case, the Alternate Unit would be given *direct* representation in the curriculum (i.e., assume the status of a Principal Unit) and the original Principal Unit would be given *indirect* representation in the curriculum (i.e., assume the status of an Alternate Unit). Some Principal Units, for some processes, do *not* have an Alternate Unit.

> PLEASE NOTE: In the EXAMPLE shown on the opposite page, only one of the Principal Units has an Alternate. That is, "20. Vacuum filter unit with coil" can *not* substitute for *both* Principal Units, only "10. Vacuum filter unit with cloth".

NONALTERNATE UNITS are Other Units that can *not* be substituted for Principal Units. This is simply because the hands-on study of the Nonalternate Unit can *not* provide an acceptable degree of transferrable skill and knowledge.

EXAMPLE

O. SLUDGE DEWATERING

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Vacuum filter unit with cloth

11. Continuous feed centrifuge unit

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Vacuum filter unit with coil

21. None

NONALTERNATE UNIT(S) *are "other" unit(s) that can* *not* *be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Drying beds

31. Sludge press unit

32. Sludge lagoon

As you can see by an examination of the EXAMPLE on the opposite page, the numbering system for the units on each SPECIFIC PROCESS UNITS sheet is as follows:

NUMBERS		UNIT GROUPINGS
10's	are used for	Principal Units
20's	are used for	Other (Alternate) Units
30's & 40's	are used for	Other (Nonalternate) Units

Further discussion and explanation of the use of the CMP in the *Curriculum Guidelines* will be found in the explanation of the GENERAL CRITERION BEHAVIORS.

EXAMPLE

E - CMP

SPECIFIC PROCESS UNITS
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

E. PRIMARY SEDIMENTATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Circular unit with telescopic valve draw off, density meter time clock, and trough with scraper

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Rectangular unit with sight glass, direct draw off, and trough with scraper

31. Rectangular unit with sight glass, direct draw off, and helical skimmer

.
.
.
.

39. Lagoon

40. Two story mechanical unit

41. Evacuator unit

(A full exposition of this example can be seen on page 570 in the Appendix.)

GENERAL CRITERION BEHAVIORS

The CMP was identified earlier as one of two essential points of reference within the *Curriculum Guidelines*; the other essential point of reference is the GENERAL CRITERION BEHAVIORS. A *General Criterion Behavior* is a comprehensive statement that defines *behaviorally* and *operationally* what the desired skill and knowledge should be after training. A General Criterion Behavior is composed of two parts, the *stimulus* and the *response:*

1. The stimulus (S) describes the overt or covert condition, circumstance, indication, substance, reaction, awareness, etc. that becomes the unique *occasion* for the trainee's response.
2. The response (R) describes the overt (manipulate, talk, etc.) or covert (think, realize, etc.) *reaction* of the trainee when confronted by an appropriate stimulus.

Examples of several S's and R's are seen in some General Criterion Behaviors shown on the opposite page ⟶

A careful reading of the EXAMPLE General Criterion Behaviors listed clearly suggests why they are designated "General". Even so, the statements offer rather explicit direction and structure regarding the competence* that a program graduate should have. Additional details and structure will be discussed in the *Curriculum Guidelines* more fully later.

---

* Additional general statements relating to what the trainee's competence should be *before* and *after* training can be found in "Trainee Characteristics: Two Year Post High School Wastewater Technology Training Program" on page 615 in the Appendix.

EXAMPLES: GENERAL CRITERION BEHAVIORS

101 →

S	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

401 →

S	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

501 →

S	R
When given the task of performing the laboratory control procedures, and confronted with the need to conduct any common laboratory analysis, identified by name, functional description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use in the conduct of the tests, and using the reference tools will describe the conduct of sampling and analysis and the facilities, equipment, and supplies involved; using the reference tools, trainee will actually perform the sampling and analysis in accordance with the most current recommendations as reported by the relevant professional organization.

601 ↔

S	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with the actual condition(s) of the wastewater entering or of the wastestream within the plant, or a verbal description or other standard representation thereof . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the process unit(s) directly involved in dealing with the condition(s) and will describe how the unit(s) deal with the specified condition(s).

709 →

S	R
When given the task of accomplishing employee dismissal, and confronted with an actual justifiable cause, by name, verbal description, or other standard representation thereof . . .	Trainee will recognize the cause as such, and, from recall, will describe the reason(s) why the cause justifies employee dismissal and will describe action(s) relating directly to the actual dismissal procedure.

715 →

S	R
When given the task of responding to criticism of plant operation, and confronted with an actual complaint from private citizens and/or public officials regarding conditions both relevant and irrelevant to the operation of a wastewater plant, or a verbal description or other standard representation thereof . . .	Trainee will recognize the complaint as relevant or irrelevant, and, from recall, will describe the type of data appropriate to the complaint in question and will describe *how* and *why* the complaint is relevant or irrelevant; using the data noted trainee will demonstrate an actual response to the complaint.

GENERAL CRITERION BEHAVIOR CATEGORIES

For convenience in collecting and organizing the data, the General Criterion Behaviors have been grouped and numbered according to the following categories:

NUMBERING SERIES	GENERAL CRITERION BEHAVIOR CATEGORIES
100's	NORMAL OPERATION PROCEDURES
200's	ABNORMAL OPERATION PROCEDURES
300's	PREVENTIVE MAINTENANCE PROCEDURES
400's	CORRECTIVE MAINTENANCE PROCEDURES
500's	LABORATORY CONTROL PROCEDURES
600's	SYSTEMS INTERACTION PROCEDURES
700's	MANAGEMENT/SUPERVISORY PROCEDURES

Definition and explanation of the seven *General Criterion Behavior Categories* follow:

> PLEASE NOTE: For effective application of the *Curriculum Guidelines*, it is most important that the concepts of "normal", "abnormal", "preventive", "corrective", etc. be used as defined herein--do *not* assume that prior use is completely appropriate to their use in this context.

NORMAL OPERATION PROCEDURES. Include those *routine* operating activities of the plant employee that do not vary significantly from day-to-day, and that are designed to *keep* the plant functioning within a normal range of values; for example, *routine* sampling at standard locations, *routine* inspections of equipment and wastestream to verify that the process is functioning properly, *routine* opening and closing of supernatant valve in return line to primary settling tank. (The General Criterion Behaviors 101 and 102 relate to Normal Operation Procedures and can be seen on page 597 in the Appendix.)

ABNORMAL OPERATION PROCEDURES. Include those activities of the plant employee that result from abnormal (*unusual* and *undesirable*) conditions of the *wastestream*. The abnormal procedures are designed to enable the plant employee to recognize when the wastestream is abnormal and to return it to an acceptable, normal condition. For example, the plant employee should recognize a black, septic influent to the primary settling tank as an abnormal condition of the wastestream, take whatever immediate action is appropriate, if any (e.g., eliminate the source of black, septic wastewater to prevent further disruption of downline processes), then determine the cause, correct it and any other adverse effects of the abnormal condition. NOTE: Actual cause of septic condition could relate to failure to manually close supernatant valve (resulting from poor Normal Operation Procedure); or to malfunctioning of timer switch controlling supernatant valve (leading to a Corrective Maintenance Procedure); or to adverse industrial discharge in collection system (resulting from poor Management/Supervisory Procedures). (The General Criterion Behaviors 201 and 202 relate to Abnormal Operation Procedures and can be seen on page 598 in the Appendix.)

PREVENTIVE MAINTENANCE PROCEDURES. Include those *routine* maintenance activities of the plant employee designed to *forestall* or *prevent* major equipment breakdown and subsequent corrective maintenance; for example, lubrication of bearings and other moving parts, replacing air and oil filters, *routine* replacement and/or adjustment of certain worn components. (The General Criterion Behaviors 301 and 302 relate to Preventive Maintenance Procedures and can be seen on page 599 in the Appendix.)

CORRECTIVE MAINTENANCE PROCEDURES. Include those maintenance activities of the plant employee that usually result from the breakdown and/or malfunction of a unit of equipment or a component thereof; for example, recognizing the indications of a malfunctioning timer switch on the supernatant valve serving the return line to the primary settling tank and knowing when and how to correct the disorder, or when and how to refer the problem to plant or contract maintenance personnel. (The General Criterion Behaviors 401 - 403 relate to Corrective Maintenance Procedures and can be seen on page 600 in the Appendix.)

LABORATORY CONTROL PROCEDURES. Include those special and routine activities of the plant employee relating to laboratory analyses, the specification of sampling procedures and locations, and the general management of the laboratory facilities; for example, determining DO, determining the sample and analysis required for a given condition of the wastestream. (The General Criterion Behaviors 501 - 503 relate to Laboratory Control Procedures and can be seen on page 602 in the Appendix.)

SYSTEMS INTERACTION PROCEDURES. Include those activities of the plant employee concerned with relating the functioning of specific units of equipment to other process units and to the system as a whole, relating specific processes to other processes and to the system as a whole, and relating the plant to the community which it serves; for example, determining how the effective functioning of the grit removal process relates to other processes and the equipment involved, determining the desired characteristics of a plant for a given community. (The General Criterion Behaviors 601 - 606 relate to Systems Interaction Procedures and can be seen on page 604 in the Appendix.)

MANAGEMENT/SUPERVISORY PROCEDURES. Include activities of the plant employee relating to employment practices, record keeping, plant operation policy, and the establishment of a constructive and realistic rapport between the plant and the community it serves. (The General Criterion Behaviors 701 - 717 relate to Management/Supervisory Procedures and can be seen on page 607 in the Appendix.)

The categories just defined are *not* necessarily intended to represent the apparent grouping of behaviors in the actual operation of a plant. Rather, the categories represent groupings of similar, related behaviors for ease in analysis and for brevity in documentation. In actual practice, a wastewater plant employee may move from a *normal operation* procedure to an *abnormal operation* procedure to a *corrective maintenance* procedure in one continuous flow of activity, with no concious differentiation in his mind and no differentiation apparent to the casual observer.

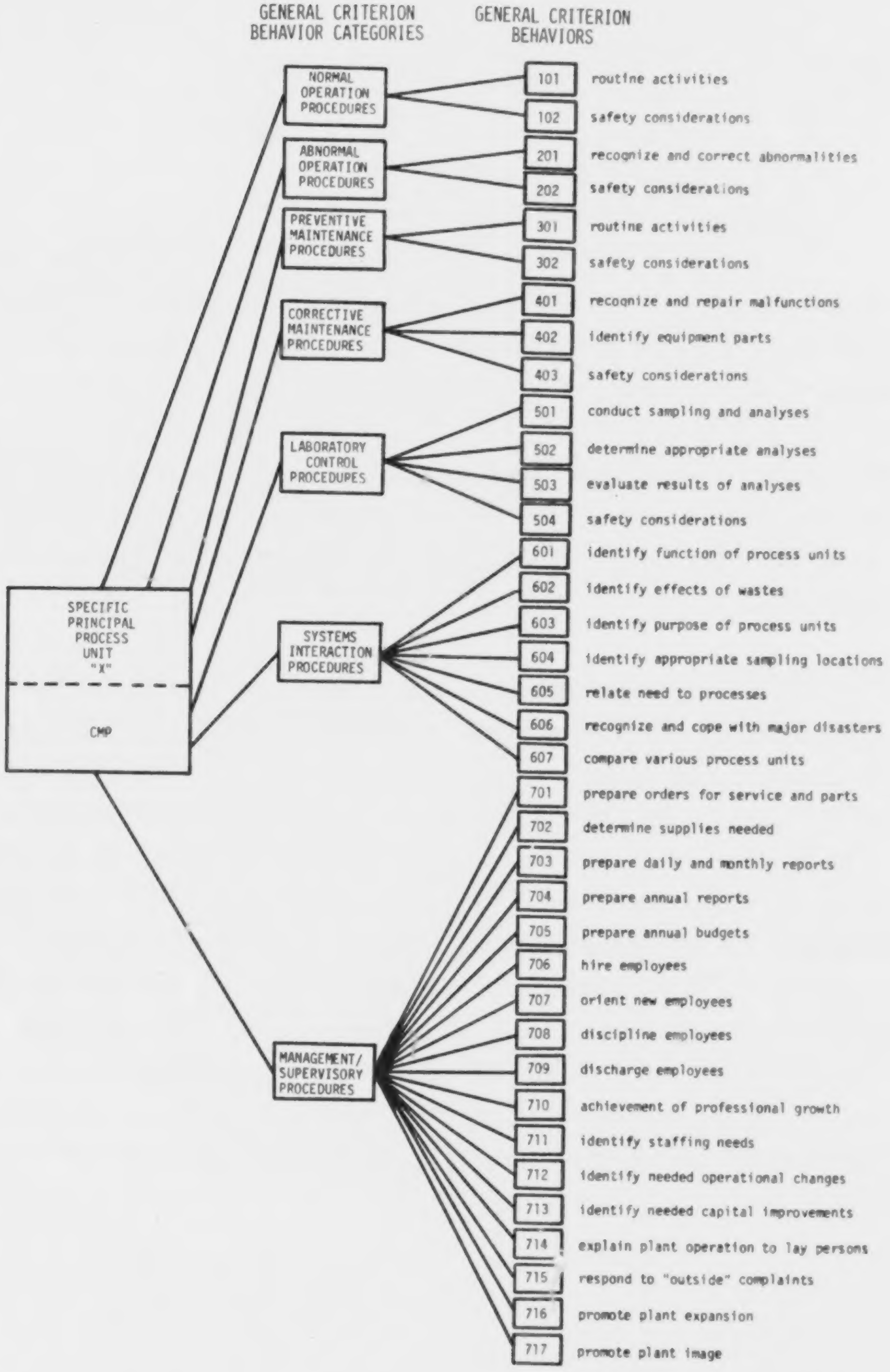
GENERAL CRITERION BEHAVIORS AND THE CMP

The chart on the opposite page graphically depicts the interrelationship among the SPECIFIC PROCESS UNITS of the CMP, the GENERAL CRITERION BEHAVIOR CATEGORIES, and the GENERAL CRITERION BEHAVIORS. For each of the twenty-two PRINCIPAL PROCESS UNITS in the CMP, there are seven GENERAL CRITERION BEHAVIOR CATEGORIES to which the UNIT relates; each of the GENERAL CRITERION BEHAVIOR CATEGORIES contains two to seventeen GENERAL CRITERION BEHAVIORS. The number for each of the GENERAL CRITERION BEHAVIORS is indicated on the chart, and a key word or phrase from the detail of each GENERAL CRITERION BEHAVIOR identifies the general purpose for the GENERAL CRITERION BEHAVIOR.

Since each one of the PRINCIPAL PROCESS UNITS is presented in terms of the relationships indicated in the chart, the comprehensiveness of the *Curriculum Guidelines* is obvious.

A detailed explanation of the format for indicating the relationships is the subject of the following section which is entitled SPECIFIC BEHAVIOR SHEETS.

RELATIONSHIPS OF ELEMENTS OF CURRICULUM GUIDELINES


GENERAL CRITERION BEHAVIOR CATEGORIES
GENERAL CRITERION BEHAVIORS
SPECIFIC PRINCIPAL PROCESS UNIT "X"
CMP
NORMAL OPERATION PROCEDURES
ABNORMAL OPERATION PROCEDURES
PREVENTIVE MAINTENANCE PROCEDURES
CORRECTIVE MAINTENANCE PROCEDURES
LABORATORY CONTROL PROCEDURES
SYSTEMS INTERACTION PROCEDURES
MANAGEMENT/ SUPERVISORY PROCEDURES
101 routine activities
102 safety considerations
201 recognize and correct abnormalities
202 safety considerations
301 routine activities
302 safety considerations
401 recognize and repair malfunctions
402 identify equipment parts
403 safety considerations
501 conduct sampling and analyses
502 determine appropriate analyses
503 evaluate results of analyses
504 safety considerations
601 identify function of process units
602 identify effects of wastes
603 identify purpose of process units
604 identify appropriate sampling locations
605 relate need to processes
606 recognize and cope with major disasters
607 compare various process units
701 prepare orders for service and parts
702 determine supplies needed
703 prepare daily and monthly reports
704 prepare annual reports
705 prepare annual budgets
706 hire employees
707 orient new employees
708 discipline employees
709 discharge employees
710 achievement of professional growth
711 identify staffing needs
712 identify needed operational changes
713 identify needed capital improvements
714 explain plant operation to lay persons
715 respond to "outside" complaints
716 promote plant expansion
717 promote plant image

SPECIFIC BEHAVIOR SHEETS

The following elements of *Curriculum Guidelines* now have been defined:

1. Composite Model Plant
    a. Processes Chart
    b. Specific Process Units
2. Principal Units
3. Other Units
    a. Alternate
    b. Nonalternate
4. General Criterion Behaviors
5. The seven General Criterion Behavior Categories

These, along with two additional elements, the SPECIFIC BEHAVIOR sheets with the "Stimulus and Response Detail", form the guidelines for the development of the curriculum.

An EXAMPLE of the basic data sheets that comprise the actual guidelines for the development of curriculum is shown on the opposite page; as indicated by ①, these sheets will be referred to as SPECIFIC BEHAVIOR sheets.

The SPECIFIC BEHAVIOR sheets are grouped according to the seven General Criterion Behavior Categories. The name of the particular category involved is shown in the first line of the sheet (see ② in EXAMPLE); the number of the particular General Criterion Behavior is shown in two places (see ③); the actual statement of the General Criterion Behavior involved is given on *each* sheet (see ④). The Composite Model Plant (CMP) process name and letter designation is shown in several places (e.g., see ⑤). From the SPECIFIC PROCESS UNITS sheets the brief description of the Principal Unit(s) involved is also shown (see ⑥). You will recall that only the Principal Units of the CMP are to be *directly* represented in the curriculum. It is for this reason that only they, and not the Other Units, are the subject for further detailing on the SPECIFIC BEHAVIOR sheets.

EXAMPLE

① SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES 101 - E
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA ⑤

② NORMAL OPERATION skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. Rectangular unit with telescopic valve draw off density meter time clock, and trough with scraper ⑥

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101: ③

S	→ R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

④

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): primary, clarifier, sedimentation unit, primary basin, settling tank, and appropriate combinations thereof.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: flights, drive motor, gear box, sprockets, chain, clutch, shear pin, skimmer trough, grease pit, sludge wells, telescopic valve (inc. wheel, stem, indicator), time clock, density meter, weirs, piping, valves (inc. gate, plug, ball, check), pumps. motors, water seal units, belts, pulleys, limit switch, variable speed drive, rails, shoes, sluice gates, baffles, first aid kit, fire fighting equipment.
2. Taking these types of actions: recording measurement of flow, density, elapsed time.

(A full exposition of this example can be seen on page 55 in the Appendix.)

STIMULUS AND RESPONSE DETAIL

The Stimulus and Response Detail (see ① and ②) make the statement of the General Criterion Behavior, as it relates to the noted Principal Unit, more specific. In the Stimulus and Response Detail, an attempt is made to provide a maximum of additional information with a minimum of documentation. In some cases, the notation listed in the Stimulus and Response Detail subcategories may provide some actual content of instruction and post-training behavior; of greater importance, however, the subcategories should provide, by implication, a more specific indication of the level and content of training. For example . . .

> In *Stimulus Detail* subcategory number one (see ③), certain actual terms are offered for inclusion in the verbal skill and knowledge of the trainee--but more than that, this also suggests the type of terms required.
>
> In *Response Detail* subcategory number one (see ④), certain actual unit components are given for inclusion as appropriate in the indicated response. Also, it is clear from the documentation that in the Normal Operation Procedure the trainee must be responsive to the telescopic valve as a gross component and to certain subcomponents of that valve (see ⑤). These notations serve to indicate both *inclusion* and *exclusion*.

EXAMPLE

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA
101 - E

NORMAL OPERATION skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant from recall, trainee will actually perform the procedure.

①

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

③

1. These terms or descriptions (not already implied): primary, clarifier, sedimentation unit, primary basin, settling tank, and appropriate combinations thereof.

②

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

④

1. Attention to these components or characteristics of the unit: flights, ⑤ drive motor, gear box, sprockets, chain, clutch, shear pin, skimmer trough, grease pit, sludge wells, telescopic valve (inc. wheel, stem, indicator), time clock, density meter, weirs, piping, valves (inc. gate, plug, ball, check), pumps, motors, water seal units, belts, pulleys, limit switch, variable speed drive, rails, shoes, sluice gates, baffles, first aid kit, fire fighting equipment.
2. Taking these types of actions: recording measurement of flow, density, elapsed time.

(A full exposition of this example can be seen on page 55 in the Appendix.)

PERFORMANCE ARROWS

The performance arrows (① and ② on opposite page) are used to indicate an important characteristic of desired posttraining behavior. The *double headed arrow* (see ①) indicates that the trainee should be able to make the appropriate response (R) when confronted with a specific instance of the stimulus (S) as described. In addition, the roles of the S and R may be reversed in such a way that the significant elements of the S are transformed into an R and the significant elements of the R are transformed into an S. For example, in EXAMPLE I, if given the information " . . . entering wastewater contains large amounts of heavy inorganic solids mixed with organic solids . . . ", the trainee should be able to make a response as indicated: " . . . the plant treatment unit to deal with this condition is the grit chamber. It has mechanisms for washing solids to remove organic materials, the heavier solids settle out in the grit chamber. Any light organic materials will be washed out of the grit (heavier solids) as it is removed from the chamber . . . "; or to offer the reverse, if given the information " . . . the grit chamber of the treatment plant separates organic solids from grit and removes the grit from the wastestream . . .", the trainee should be able to make a response as indicated: " . . . especially useful where the influent wastewater contains large quantities of grit and/or grit and organic solids . . ."

The *single headed arrow* (see ②) indicates that the roles of the S and R may *not* be reversed. Thus, in EXAMPLE II, the trainee is expected to perform such behaviors only in the direction indicated by the arrow. Of course, the trainee *may* learn to describe the probable indications of a mechanically malfunctioning component of a unit of equipment but the instruction would *not* be designed expressly to achieve this learning nor would the trainee be tested for such learning.

EXAMPLE I

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA
601 A - U

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS . . .

A - U (Operational Processes of the Composite Model Plant)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 601:

←→ ← ①

S	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with the actual condition(s) of the wastewater entering or of the wastestream	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the process unit(s) directly involved in dealing with the

EXAMPLE II

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA
401 - D

CORRECTIVE MAINTENANCE skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

→ ← ②

S	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order

MISCELLANEOUS CHARACTERISTICS

All the major elements and characteristics of the SPECIFIC BEHAVIOR sheets have now been defined. However, a few minor characteristics remain that require some clarification:

In EXAMPLE I, the reference number shown (see ①) has been placed in a position to facilitate location of SPECIFIC BEHAVIOR sheets. This number is usually made up of the General Criterion Behavior involved (101 in the example) and the identifying letter of the CMP process involved ("B" for Prechlorination in the example). As is the case in EXAMPLE I, most of the SPECIFIC BEHAVIOR sheets will also identify and relate to a *specific* Principal Unit of the CMP (see ②). This will be true for at least all of the first four General Criterion Behavior Categories: Normal Operation Procedures (100's), Abnormal Operation Procedures (200's), Preventive Maintenance Procedures (300's), and Corrective Maintenance Procedures (400's).

In EXAMPLES II and III, ③ and ④ show other ways in which a SPECIFIC BEHAVIOR sheet can be referenced. In EXAMPLE II, the General Criterion Behavior involved applies rather generally to the entire process as designated (see description ③). In EXAMPLE III (see ④) processes "A - U" is the indicated reference because the General Criterion Behavior involved applies generally to all processes and Principal Units of the CMP and this is adequately defined by the PROCESSES CHART and the SPECIFIC PROCESS UNITS sheets.

EXAMPLE I

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

101 - B ①

NORMAL OPERATION skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. *Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator* ②

as it rel TERION BEHAVIOR NUMBER 101

EXAMPLE II

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

501 - V

LABORATORY CONTROL skill and knowledge for LABORATORY CMP UNIT . . .

V *(Laboratory Control)* ③

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 501:

EXAMPLE III

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

602 A - U

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS . . .

A - U *(Operational Processes of the Composite Model Plant)* ④

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 602:

SUMMARY

This concludes the definition and description of the SPECIFIC BEHAVIOR sheet. To recap: SPECIFIC BEHAVIOR sheets are the basic source of information (guidelines) for the development of curriculum. On any given sheet, the GENERAL CRITERION BEHAVIOR, used as an inclusive point of reference, supplemented by the CMP and its SPECIFIC UNITS and by the STIMULUS and RESPONSE DETAIL, should clearly pinpoint, for technically qualified instructors, the posttraining behavior desired of the program graduate and should permit the instructors to develop *uniform, job related* curricula. The actual SPECIFIC BEHAVIOR sheets begin on page 41; a discussion of the POSTTRAINING PERFORMANCE EVALUATION CONDITIONS AND CRITERIA follow immediately.

POSTTRAINING PERFORMANCE EVALUATION CONDITIONS AND CRITERIA

CONDITIONS

The posttraining performance of the trainee will be evaluated under two general conditions: "Verbal Test Conditions" and "Practical Test Conditions".

The *Verbal Test Conditions* (VTC) evaluate the trainee's posttraining ability to verbally respond to specific questions and/or describe appropriate behaviors under a given set of circumstances. Verbal testing must always be in the actual or simulated environment most relevant to the behavior in question. Simulation in the VTC will usually be in the form of verbal descriptions or pictures. When actual environments are used in the VTC, they will be used only as conditions (stimuli) to be responded to verbally, not physically. For example, the trainee may be confronted with an actual wastestream and asked to verbally describe the proper course of action based upon his observation of the condition of the wastestream; the trainee will not actually (physically) involve himself in any procedure to treat or control the condition. All elements of the VTC must clearly suggest the operational context to which they are relevant; for example, as applied to a standard "test question" . . .

> ACCEPTABLE: "During your routine inspection of the secondary clarifier, gas bubbles and large chunks of solids are noted on the surface. List the probable causes for this condition."
>
> UNACCEPTABLE: "What malfunctions are found in secondary clarifiers and what undesirable conditions of the wastestream do they cause?"

The *Practical Test Conditions* (PTC) evaluate the trainee's posttraining ability to actually (physically) respond in realistic settings or to respond to specific questions or descriptions related to actual or simulated equipment and conditions. Practical testing must always be in the presence of the actual or simulated environment most relevant to the behavior in question. Practical testing will usually be in actual, functioning plants or may employ the use of discrete units of actual equipment or highly realistic mock-ups of the process unit(s) in question. All elements of the PTC must clearly suggest the operational context to which they are relevant.

> PLEASE NOTE: No aspects of the VTC should be conducted concurrent with PTC--except that the trainee's verbal skills may be demonstrated in the PTC to the extent they are appropriate to actual performance.

The trainee's posttraining skill and knowledge will be verified by evaluation under both VTC and PTC. Appropriate sampling and test construction techniques will be employed to ensure comprehensive coverage.

Evaluations of the trainee will be spaced in time to verify *acquisition* of skill and knowledge *during* training and to verify *retention* of skill and knowledge to some *reasonable* point in time *beyond* training.

The design of the elements (questions, case problems, equipment set-ups, etc.) of the VTC and the PTC should be based on the GENERAL CRITERION BEHAVIORS and the CMP and in no case behaviorally incompatible or not clearly implicit therein.

The design of the elements of the VTC and the PTC--especially the latter--should include objective standards by which to evaluate correctness of trainee behavior and by which to quantify results. Time-required-to-perform, only when appropriate in terms of actual job performance, may be used in evaluating trainee's performance; the maximum length of time permitted to perform must be based on actual job needs.

CRITERIA

In general, acceptable posttraining performance by the trainee will be achieved in any given instance of a *verbal* or *practical* test when the scores obtained represent . . .

≥ 70% correctness in VTC

≥ 80% correctness in PTC

Obviously, certain skill and knowledge are more critical than others. Therefore, it is expected that an instructor will need to exercise individual discretion in the assignment of specific values to specific behavior until such time as standardization can occur.

USE OF THE CURRICULUM GUIDELINES

The following recommendations will provide a *general* indication of how the *Curriculum Guidelines* may be used in curriculum development.

PREPARATION

Successful use of the *Curriculum Guidelines* in developing related curriculum will depend largely on the user's facility with the *Curriculum Guidelines'* concepts, terminology, and design. The first 39 pages of the *Curriculum Guidelines* should be studied as often as needed to maintain a high level of user skill; the Glossary (page 625 in the Appendix) should be referred to as needed to cope with any new terminology and concepts. As a conclusion to the first 39 pages, you should, in fact, read the Glossary as a review of the terms and concepts already discussed and as an introduction to some basic terms and concepts not yet given explicit consideration in the first 39 pages. In addition to the first 39 pages and Glossary, workshops and consultation are available for those who desire assistance and guidance in the implementation of the *Curriculum Guidelines*.

It is highly unlikely that any one person should attempt the design of a total curriculum based on the *Curriculum Guidelines*. The explicit approach implied by the *Curriculum Guidelines* makes mandatory a degree of knowledge and skill seldom if ever found in one person and a degree of attention to detail that would require an amount of time prohibitive for one person. Ideally, the task is best suited to the well-coordinated input from the qualified staff of several institutions. The high degree of competence and time required is not only to ensure adequate inclusions in the curriculum in accordance with the *Curriculum Guidelines* but also appropriate exclusions.

AN APPROACH

The *Curriculum Guidelines* may be used to make an existing curriculum more explicit and relevant or to develop a completely new curriculum--though not necessarily the quickest, the latter is the preferred. In either case, the detail behavior implied by the CMP Unit specific criterion behaviors will have to be made *explicit*. One of the simplest and most directly useful ways to do this is to express the detailed behavior in the form of a comprehensive documentation of criterion test items, problems, situations, etc. These criterion test elements will include, as appropriate, verbal question and answer items, verbal problem solving items, and practical (physical) problem solving items. The information provided on each SPECIFIC BEHAVIOR sheet will indicate the extent to which your criterion test elements should reflect verbal, manipulative, and conceptual skill and knowledge. For example, even the most casual examination of the SPECIFIC BEHAVIOR sheet on the opposite page clearly reveals the need for . . .

1. Conceptual knowledge (e.g., when is the grit removal screw worn badly enough to warrant concern?)
2. Simple recall knowledge (e.g., recalling names of relevant reference tools)
3. Verbal skill and knowledge (e.g., being able to describe nature of repair)
4. Manipulative skill and knowledge (e.g., actually performing the indicated repair).

The pattern employed when further detailing the SPECIFIC BEHAVIOR in the form of criterion test elements and the grouping of these elements may vary. It is probable that the pattern and grouping used will be most easily approached and serve the best purpose if possessed of a consistent and homogeneous quality. For example, all the General Criterion Behaviors 100's through 400's might be detailed as a group for each Principal Unit of each process in turn; then, the derived criterion test elements would be appropriately cross-referenced and grouped according to General Criterion Behavior Categories. (This grouping assumes that learning and eventual performance will be facilitated if Normal Operation Procedures are taught first, followed by Preventive Maintenance Procedures, etc.)

EXAMPLE

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA
401 - D

CORRECTIVE MAINTENANCE skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfuntions or these indications thereof: atypical sound, higher than normal temperature, vapors, vibration, pilot lights off, inoperative unit, unlubricated bearings, overloaded prime movers, electrical motor inoperative, electrical control equipment inoperative, grease or oil on motor windings, insulation burned off electrical wiring, overloaded process, absence of agitation.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

(A full exposition of this example can be seen on page 323 in the Appendix.)

With the homogeneously grouped and appropriately cross-referenced criterion test elements available, the curriculum developer is ready to move to define the courses of study needed, their content, their sequence and duration, and the instructional methods and media to be employed. The systematically derived criterion test elements should readily provide insight into the most appropriate learning environments (e.g., the need for actual, in context, manipulative skill and knowledge will strongly suggest in-plant instruction, the need for most verbal and some conceptual skill and knowledge will suggest a classroom or self study learning experience).

The comprehensive list of criterion test elements developed for the purpose of defining curriculum also will be drawn on to furnish the design data for the development of "sampling" test to administer to trainees to verify learning. Of course, this learning will be subsequently verified by the trainee's on-the-job performance, possibly using check lists based on the SPECIFIC BEHAVIOR and the comprehensive lists of criterion test elements.

The approach that has been briefly discussed is represented in the flow diagram on the opposite page. The steps 1 - 6 represent the process and products:

1. The SPECIFIC BEHAVIOR as defined by the CMP processes and units, the GENERAL CRITERION BEHAVIORS, and the STIMULUS and RESPONSE DETAILS and as documented on the SPECIFIC BEHAVIOR sheets

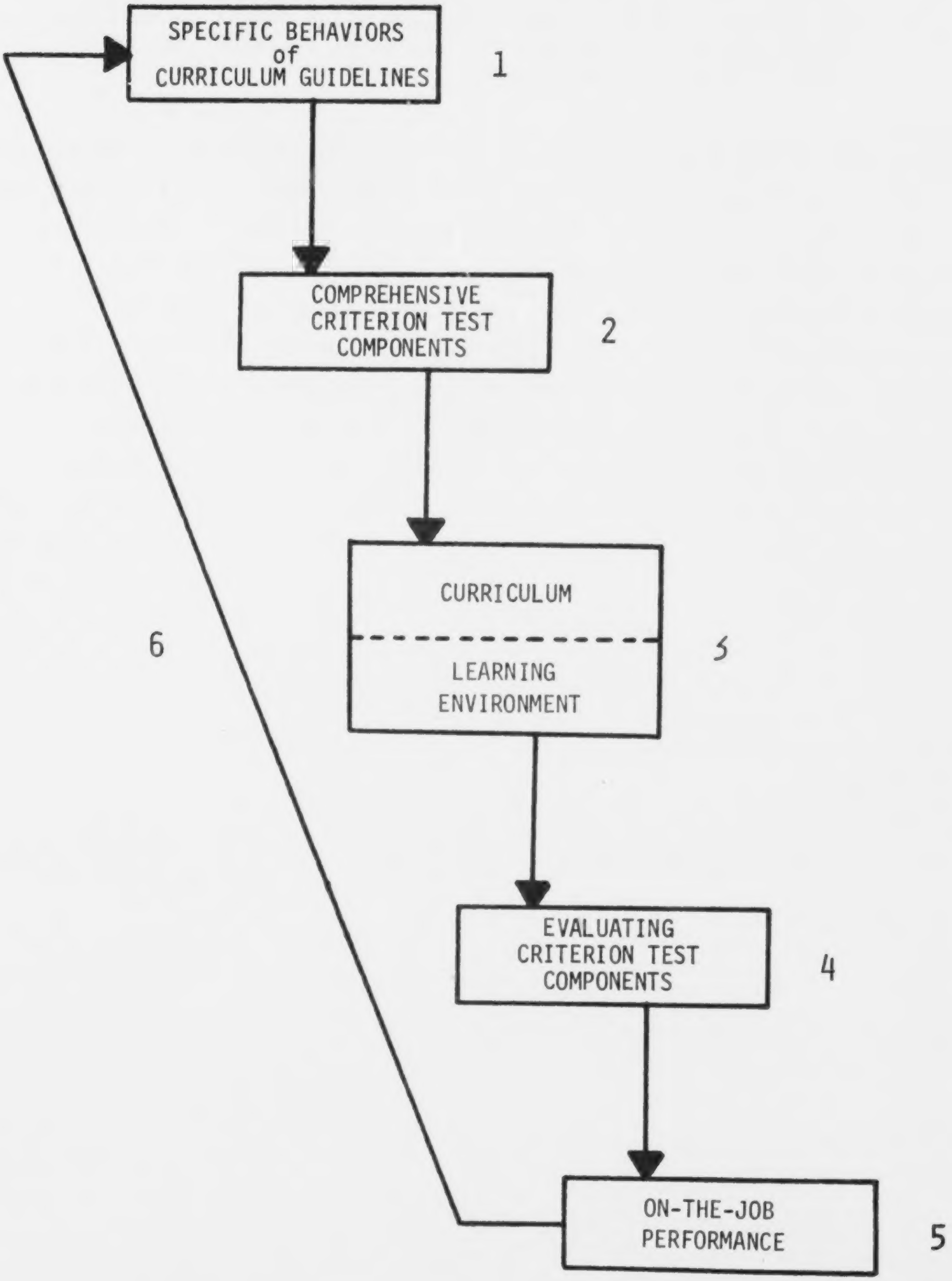
2. The comprehensive list of criterion test elements representing the further detailing of behavior as stipulated and implied by the SPECIFIC BEHAVIOR sheets

3. Showing the close relationship between the Curriculum and the Learning Environment as developed based on the explicit criterion test elements

4. The "samples" of the comprehensive criterion test elements that are used to evaluate the trainee's learning periodically during and after training

5. The on-the-job performance which is the final test of the relevance of the *Curriculum Guidelines* and the effectiveness of the actual curriculum

AN INSTRUCTIONAL SYSTEM DESIGN


SPECIFIC BEHAVIORS of CURRICULUM GUIDELINES
1
COMPREHENSIVE CRITERION TEST COMPONENTS
2
CURRICULUM
LEARNING ENVIRONMENT
3
EVALUATING CRITERION TEST COMPONENTS
4
ON-THE-JOB PERFORMANCE
5
6

6. The feedback that provides the self-correcting capacity of any closed loop system; for example, the feedback based on the observation of the actual on-the-job performance of trainees permits continual improvement of the training system by the elimination of techniques which result in inferior on-the-job performance and the inclusion of techniques which improve on-the-job performance.

This concludes the first 39 pages of the *Curriculum Guidelines.* If you have not done so already, you should now acquaint yourself with the contents of the Appendix; this includes: the "Composite Model Plant", the "General Criterion Behaviors", the "Trainee Characteristics: Two Year Post High School Wastewater Technology Training Program", and the "Glossary". You are encouraged to return to the first 39 pages and the Appendix as needed to renew your skill with essential terms and concepts. The SPECIFIC BEHAVIOR sheets follow. On the opposite page is a summary description of the characteristics and functions of the SPECIFIC BEHAVIOR sheets; you may wish to remove the page for more accessible reference as you work with the sheets.

SUMMARY DESCRIPTION OF SPECIFIC BEHAVIOR SHEETS

The following coded descriptions relate to SPECIFIC BEHAVIOR sheets as shown in the EXAMPLE ⟶

① The title of these sheets that present the most detailed statement within the *Curriculum Guidelines* of what the proposed curriculum should accomplish.

② The identifying number assigned to the particular general objective (statement) that is the subject of the EXAMPLE. The statement indicates what the trainee will be able to do after training and is called a GENERAL CRITERION BEHAVIOR. (See note ⑨ below.)

③ The identifying letter assigned to the particular Composite Model Plant (CMP) process that is the subject of the EXAMPLE. On some sheets this identification will be shown as a range of letters (e.g., A - U) to indicate that more than one process is being considered. (See note ④ below.)

④ The name of the particular Composite Model Plant (CMP) process that is the subject of the EXAMPLE. On most sheets this will be a very specific *operational* process; on other sheets this will be a more general process (e.g., MANAGEMENT/SUPERVISORY). (See note ③ above.)

⑤ A brief description of the type of process unit that is the subject of the EXAMPLE. This unit will be *directly* represented in the proposed curriculum and is the process unit about which further information is provided on the sheet.

⑥ The identifying number assigned to the process unit that is the subject of the EXAMPLE. (See note ⑤ above.)

⑦ The name of the category of procedures to which the General Criterion Behavior that is the subject of the EXAMPLE belongs. There are seven such categories containing a total of thirty-seven (37) General Criterion Behaviors.

⑧ See note ② above.

⑨ The actual statement of the general objective that is the subject of the EXAMPLE. This statement is called a GENERAL CRITERION BEHAVIOR and indicates what the trainee will be able to do after training. It is stated in terms of the circumstance or condition (S) that a trainee should be responsive to and what that response (R) should be.

⑩ The arrow indicates whether essential elements of the "S - R" can be transposed so that elements of "S" become "R" and "R" becomes "S". The single headed arrow ⟶ says "NO", a double headed arrow ⟷ says "YES".

⑪ The most detailed statements within the *Curriculum Guidelines* are contained in the Stimulus (S) and Response (R) Detail. This detail makes more explicit what the General Criterion Behavior (see note ⑨) implies with respect to the particular process involved (see note ③). One or more subcategories of detail are listed under the Stimulus and Response Detail headings.

EXAMPLE

① SPECIFIC BEHAVIOR ②
CURRICULUM GUIDELINES 101 - E ③
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

⑦
NORMAL OPERATION skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . . ④

⑤
⑥ E-10. *Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101: ⑧

S ⟶ ⑩	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

⑨

⑪

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): primary, clarifier, sedimentation unit, primary basin, settling tank, and appropriate combinations thereof.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: flights, drive motor, gear box, sprockets, chain, clutch, shear pin, skimmer trough, grease pit, sludge wells, telescopic valve (inc. wheel, stem, indicator), time clock, density meter, weirs, piping, valves (inc. gate, plug, ball, check), pumps, motors, water seal units, belts, pulleys, limit switch, variable speed drive, rails, shoes, sluice gates, baffles, first aid kit, fire fighting equipment.
2. Taking these types of actions: recording measurement of flow, density, elapsed time.

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GENERAL CRITERION BEHAVIOR

101

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

101 - A

NORMAL OPERATION skill and knowledge for COLLECTION CMP UNIT . . .

A-10. Combined system with industrial waste

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): sewer, sewerage, sewer system, collection system, gravity flow system, force main system.
2. These reference tools: sewer system map.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: sewer (e.g., interceptor, collector, lateral, branch, main, pressure, etc.), house connection, sewer tap, materials (e.g., vitreous clay pipe, asbestos-cement pipe, concrete pipe, cast iron pipe, steel pipe, etc.), pipe joints (e.g., O-ring, compression, bituminous, hydraulic mortar, epoxy mortar, etc.), manholes (e.g., brick, concrete block, concrete cast-in-place, concrete pre-cast, steel, etc.), functions of manholes (e.g., change flow, change direction, change elevation, vent system, clean-out, etc.), tap line for new connections, inverted siphon, dosing tank, manhole covers (unsealed and sealed), regulators, weirs, (e.g., side overflow, leaping, etc.), flap gates, catch basins, fire fighting equipment, first aid kit.

Continued on following page

Continued from previous page, Specific Behavior 101-A

2. Attention to these conditions of the wastestream: level in manhole, floating solids, odor (e.g., H_2S, hydrocarbons, etc.), color, flow, turbidity, pH, temperature.
3. Operational adjustments of these components: weirs, regulators.
4. Using these tables, graphs, nomographs, and/or performing these calculations: flow nomographs for Kutter's equation and flow graphs.
5. Essential use of these terms (not already implied): vented manhole covers, odor (e.g., solvent, etc.).

NORMAL OPERATION skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): upstream chlorination, remote chlorination, off plant chlorination, brand names.

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: regulators (chlorine pressure, injector vacuum, water pressure), cut chart, gas rate controller, rotameter float, cylinders, vent fan, pig tails (inc. caps), valves (e.g., header, pressure relief, pressure reducing, cylinder, etc.), hoist, wastewater flow rate, chart drive, recording chart, pen, compressor, drive belt, motor, air storage tank, scales, pneumatic control device, alarm system (e.g., leak detection device, chlorine pressure, evaporator water level, etc.), evaporator, rupture disc, first aid kit, fire fighting equipment.
2. Taking these types of actions: replacement of chlorine cylinders, recording chart, ink pens; start-up, shut-down; taking operating readings (e.g., cylinder weight, total pounds fed, feed rate, etc.).
3. Attention to these conditions of the wastestream: flow rate, odor, chlorine demand.

Continued on following page

Continued from previous page, Specific Behavior 101-B

4. Taking these laboratory samples: grab samples (before and after chlorination).
5. Operational adjustments of these components: chlorine regulator valve, injector vacuum control.
6. Using these tables, graphs, nomographs, and/or performing these calculations: chlorine dose, mg/l; chlorine residual, mg/l; dose rate, #/day.
7. Essential use of these terms (not already implied): metal chart.

NORMAL OPERATION skill and knowledge for SCREENING AND GRINDING CMP UNIT...

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following...

1. These terms or descriptions (not already implied): bar screen, screening device, screens, rack, brand names.

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following...

1. Attention to these components or characteristics of the unit: chain (inc. attachment links, link pins, cotter pins, shear pins, slackness), sprockets, rakes (inc. angle, attachment bolts), rake cleaner (inc. shock absorber, connector), screen belt (inc. adjustment mechanism, scraper, rollers), rake drive (inc. motor, gear box, drive chain, sprocket), belt drive (inc. motor, gear box, drive belts, pulleys), bar screen enclosure (inc. doors, covers), shaft, grinder (inc. motor, drive belt, pulleys, atypical sound), bubbler control, effective surface of bar rack, flush water device, ampres drawn, alarm, bar rack, flushing valve, electrical overload device, fire fighting equipment, speed reducers.
2. Taking these types of actions: recording the number of cycles.
3. Attention to these conditions of the wastestream: color, odor, floating material, debris (e.g., rocks, wood, paper, etc.), flow.

Continued on following page

Continued from previous page, Specific Behavior 101-C

4. Taking these laboratory samples: grab or composite upstream of screens.
5. Operational adjustments of these components: air rate.
6. Using these tables, graphs, nomographs, and/or performing these calculations: screenings, ft^3/mg.
7. Essential use of these terms (not already implied): reverse flush.

NORMAL OPERATION skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S ⟶	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): grit chamber, grit tank, grit collector, grit removal unit, brand names.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: blower, motor and mounting, speed reducer, manifold, piping, weir, air pressure relief, silencer, air cleaner, electrical control equipment, couplings, pressure indicating device, baffles, diffusers, tank, gear box, receiving hopper, chains (inc. shear pins, special links, cotter pins, link pins), buckets, shoes, guide rails, sprockets, shafts, shaft bearings (grease lubricated and water lubricated), belts, tighteners, blower and bucket drive speed controls, valves (control, check), fire fighting equipment, first aid kit.
2. Attention to these conditions of the wastestream: flow rate, color, odor of liquid and grit, agitating velocity, floating material, temperature.
3. Taking these laboratory samples: grab grit sample, composite plant influent.

Continued on following page

Continued from previous page, Specific Behavior 101-D

4. Operational adjustments of these components: air supply (volume), bucket speed.
5. Using these tables, graphs, nomographs, and/or performing these calculations: volume grit (vol. grit/vol. raw flow).
6. Essential use of these terms (not already implied): differential settling.

NORMAL OPERATION skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. *Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S ⟶	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): primary, clarifier, sedimentation unit, primary basin, settling tank, and appropriate combinations thereof.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: flights, drive motor, gear box, sprockets, chain, clutch, shear pin, skimmer trough, grease pit, sludge wells, telescopic valve (inc. wheel, stem, indicator), time clock, density meter, weirs, piping, valves (inc. gate, plug, ball, check), pumps, motors, water seal units, belts, pulleys, limit switch, variable speed drive, rails, shoes, sluice gates, baffles, first aid kit, fire fighting equipment.
2. Taking these types of actions: recording measurement of flow, density, elapsed time.
3. Attention to these conditions of the wastestream: color, odor, excessive grease, oil, rags, velocity, solids concentration, floating sludge, pH, suspended solids, total solids, BOD, settleable solids, total volatile solids, temperature.

Continued on following page

Continued from previous page, Specific Behavior 101-E

4. Taking these laboratory samples: grab and composite primary influent, grab and composite primary effluent, grab and composite raw sludge.
5. Operational adjustments of these components: telescopic valve, sludge pump, skimmer, inlet gates or valves, inlet speed or operation.
6. Using these tables, graphs, nomographs, and/or performing these calculations: detention time, pounds of solids removed, surface overflow rate, weir overflow rate, solids removal efficiency.
7. Essential use of these terms (not already implied): settled sewage, scum.

NORMAL OPERATION skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. Rotary distributor, standard rate unit with dosing tank

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): trickling filter (e.g., high rate, etc.), filter, filter bed, bacteria bed, forced air filter, brand names.

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: dosing tank (inc. piping, bell, structure), rotary distributor (inc. ports, rotation speed), media (inc. biological growth), structure (inc. underdrains if visible), blow off pipe, siphon breaker, motors, belts, fan, vents, first aid kit, fire fighting equipment.
2. Attention to these conditions of the wastestream: odor, icing conditions, color (e.g., abnormal color of growth on media, etc.), ponding, DO, pH, relative stability, flow (high, low), oil, filter flies.
3. Taking these laboratory samples: grab or composite filter influent and effluent.
4. Consideration of these process variations: recirculation schemes (e.g., roughing, polishing, standard rate, high rate, single stage, two stage and brand names).

Continued on following page

Continued from previous page, Specific Behavior 101-F

5. Operational adjustments of these components: recycle pumps.
6. Using these tables, graphs, nomographs, and/or performing these calculations: hydraulic loading, organic loading, recirculation rate.

NORMAL OPERATION skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): activated sludge, conventional aerator, brand names.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: motors, blowers, manometers, pumps, indicator lights, diffuser tubes, header, valves, indicator gages, meters (e.g., primary effluent, return sludge, air, etc.), foam spray system, fire fighting equipment, first aid kit.
2. Taking these types of actions: balancing flow to all tanks.
3. Attention to these conditions of the wastestream: volume, suspended solids, pH, dissolved oxygen, color, odor, froth, bulking, foam, transparency.
4. Taking these laboratory samples: composite of aeration influent and effluent, composite of return sludge.
5. Consideration of these process variations: conventional, step aeration, modified, activated, contact stabilization, complete mix, biosorption, high rate, extended aeration, aerated lagoon, Kraus.

Continued on following page

Continued from previous page, Specific Behavior G-101

6. Operational adjustments of these components: air blower return sludge pump, valves (e.g., influent, return sludge, air, etc.).
7. Using these tables, graphs, nomographs, and/or performing these calculations: DO content, sludge age, # BOD/100 SS, system balance, # BOD applied/day, # BOD removed/day, percent efficiency, # SS in system, SVI, SDI, MLSS, 30 min. settleable solids, air requirements, ft^3 air/# BOD applied, ft^3 air/# BOD removed, detention time, settling rate curves, aeration rate.

NORMAL OPERATION skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): sedimentation unit, secondary basin, settling tank, final clarifier and appropriate combinations thereof, brand names.

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: collector sweeps, drive motor, gear box, shear pin, skimming device (e.g., sprays, telescopic valve, etc.), weirs, valves (gate, plug, ball, check), gates (sluice, shear), baffles, pumps, motors, water seal units, belts, pulleys, coupling, limit switch, variable speed drive, control hoops, indicators (e.g., flow, return rate, etc.), first aid kit, fire fighting equipment.
2. Taking these types of actions: recording measurement of flow, density, elapsed time.
3. Attention to these conditions of the wastestream: color, odor, excessive grease, oil, rags, velocity, solids concentration, floating sludge, suspended solids, BOD, temperature, floating solids, floc.
4. Taking these laboratory samples: grab and composite of secondary influent and effluent, grab and composite of return activated sludge.

Continued on following page

Continued from previous page, Specific Behavior 101-H

5. Operational adjustments of these components: telescopic valve, sludge pump, inlet gates or valves, inlet speed or operation.
6. Using these tables, graphs, nomographs, and/or performing these calculations: rate of sludge withdrawal, detention time, weir overflow rate, solids loading (lb/ft^2), surface overflow rate.
7. Essential use of these terms (not already implied): settled sewage, scum.

NORMAL OPERATION skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S ⟶	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): Oxidation pond, sewage lagoon, waste stabilization lagoons, polishing lagoons, brand names.

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: surface condition, algae growth, color, overflow, seepage, influent lines, effluent lines, wastestream, levee conditions, pumps, motors, valves, chemical conditioning units, diversion box, first aid kit, fire fighting equipment, comminutor.
2. Attention to these conditions of the wastestream: color, odor, temperature, floating materials, DO, flow, ice cover.
3. Taking these laboratory samples: grab or composite of pond influent and effluent.
4. Operational adjustments of these components: pond level, chemical feed rate.
5. Using these tables, graphs, nomographs, and/or performing these calculations: BOD loading/day/1000 sq. ft., population equivalent, percent reduction, BOD load/day/acre.
6. Essential use of these terms (not already implied): photosynthesis.

NORMAL OPERATION skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): thickener, sludge dewatering device, floatation device, brand names.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: skimmer, chain, sprocket, flights, track, drive motor, gear reducer and drive chain, screw drive motor, overflow weir adjustments, pressure tanks, pressure tank regulator valve, sight glass, air compressor, pulley, drive belts, control board (inc. air pressure gages), butterfly valve position, pumps, gear box, first aid kit, fire fighting equipment.
2. Attention to these conditions of the wastestream: flow (high, low), wash water rate (high, low), sludge blanket depth, solids concentration in influent and effluent, grease, frozen sludge blanket, color, texture, odor.
3. Taking these laboratory samples: timed grabbed influent sludge, effluent sludge, thickener overflow, and thickener underflow samples.
4. Operational adjustments of these components: skimmer (e.g., speed, etc.), screw (e.g., speed, etc.), wash water rate valve, air pressure controls.

Continued on following page

Continued from previous page, Specific Behavior 101-J

5. Using these tables, graphs, nomographs, and/or performing these calculations: wash water flow rate, lbs. solids applied, lbs. solids removed, lbs. solids/ft^2, percent efficiency.

NORMAL OPERATION skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. *Fixed cover, gas recirculation unit with external heat exchanger*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S	→	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .		Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): anaerobic digester, sludge digester, digestion tank.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: gas recirculation system (inc. compessor, oiler, pressure gage, valve timer, valves), heat exchanger (inc. exhaust fan, pilot light assembly, flame, hot water recirculation pump, sludge temperature, water temperature), recirculation pump (inc. motor) sludge pump (inc. motor, variable speed drive, belt pulley), supernatant overflow, manometers, pressure and vacuum relief valves, water traps, meters (e.g., sludge flow, density, gas, etc.).
2. Attention to these conditions of the wastestream: temperature, pH.
3. Taking these laboratory samples: grab sample of influent, sludge in tank, gas, grab sample of supernate.
4. Operational adjustments of these components: heat exhanger, recycle valves.
5. Using these tables, graphs, nomographs, and/or performing these calculations: detention time, solids retention time, loading (lb. volatile solids/cu. ft./day.

NORMAL OPERATION skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. Floating cover unit with gas storage

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): anaerobic digester, sludge digester, digestion tank.

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: pump, motor, variable speed drive, drive belt manometer, floating cover, vacuum-pressure relief valve.
2. Attention to these conditions of the wastestream: supernatant quality, digested sludge quality, temperature, pH.
3. Taking these laboratory samples: grab sample of influent, sludge in tank, supernatant, gas, and digested sludge.
4. Operational adjustments of these components: supernatant rate control valve.
5. Using these tables, graphs, nomographs, and/or performing these calculations: solids retention time, lb volatile solid/ft^3.

NORMAL OPERATION skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S —→	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): chemical conditioning, coagulation, flocculation, sludge conditioning, elutriation, counter-current elutriation.

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: elutriation [e.g., tanks, pumps, flights, collector, chains (e.g., links, link pins, shear pins, etc.), sprockets, shafts, motor, speed reducer, couplings, rails, shoes, valves, flow meters, bucket elevator, overload alarms, etc.]; chemical conditioning tank [e.g., agitator drive, chemical feed pumps (speed reducers and controls), chemical storage, chemical dry tanks, chemical feeders, slakers (e.g., paste, liquid, etc.), coagulants (e.g., ferric chloride, lime, chlorinated copperas, polyelectrolytes--cationic, anionic, nonionic--, etc.)]; elutriation and chemical conditioning tank [fire fighting equipment, first aid kit, control loops (e.g., pH, etc.)].
2. Attention to these conditions of the wastestream: solids concentration, solids composition, origin of sludge (e.g., raw, digested, trickling filter, waste activated, elutriated, etc.), pH, color, odor.

Continued on following page

Continued from previous page, Specific Behavior 101-M

3. Taking these laboratory samples: grab sample of influent, effluent, and supernatant.
4. Consideration of these process variations: Laboon, Steymann.
5. Operational adjustments of these components: mixing time controls, mixing speed controls, feed rate control.
6. Using these tables, graphs, nomographs, and/or performing these calculations: GPM of sludge and chemicals, pounds/min. of sludge and chemicals, dewatering, percent dosage of chemicals.

NORMAL OPERATION skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): chlorine contact chamber, closed loop residual control, chlorine system, chlorine analyzer.

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: regulators (chlorine pressure, injector vacuum, water pressure), cut chart, gas rate controller, rotameter float, cylinders, vent fan, pig tails, (inc. caps) valves (e.g., header, pressure relief, pressure reducing cylinder, etc.), hoist, wastewater flow rate, chart drive, recording chart pen, compressor, drive belt, motor, air storage tank, scales, pneumatic control device, alarm system (e.g., leak detection device, chlorine pressure, evaporator water level, etc.), first aid kit, fire fighting equipment, evaporator, rupture disc, analyzer, tubes, filters, buffer solution, sample pump and motor.
2. Taking these types of actions: replacement of chlorine cylinders, recording chart, ink pens, start-up, shut-down; taking operating readings e.g., cylinder weight, total pounds fed, feed rate, etc.), mixing buffer solution.

Continued on following page

Continued from previous page, Specific Behavior 101-N

3. Attention to these conditions of the wastestream: flow rate, odor, chlorine demand, chlorine residual.
4. Taking these laboratory samples: grab sample before and after chlorinator.
5. Operational adjustments of these components: chlorine regulator valve; injector vacuum control; buffer flow control.
6. Using these tables, graphs, nomographs, and/or performing these calculations: chlorine dose, mg/l; chlorine residual, mg/l; dose rate, #/day.

NORMAL OPERATION skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These terms or descriptions (not already implied): vacuum filtration

RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. Attention to these components or characteristics of the unit: blower; vacuum, filtrate and sludge pumps (inc. motor, pulley, belt); vacuum gage; agitator (inc. motor, variable speed drive); conveyor belt; rollers; scrapers; chemical conditioning apparatus; solids content; rotameters; mixing tank (inc. stirrer); oil valve; first aid kit; fire fighting equipment.
2. Attention to these conditions of the wastestream: cake consistency, filtrate density, influent sludge concentration.
3. Taking these laboratory samples: grab samples of cake, filtrate and feed.

Continued on following page

Continued from previous page, Specific Behavior 101-0

4. Operational adjustments of these components: vacuum control, agitator speed control, chemical feed control.
5. Using these tables, graphs, nomographs, and/or performing these calculations: percent solids removed, cost per ton.

--For specific CMP UNIT 0-11--

1. Attention to these components or characteristics of the unit: sludge pump, motor (inc. bearings, pressure, vibration), pressure gage, variable speed drive (inc. belt, pulley), centrifuge (inc. motor, drive belt vibration, amperage, gage, noise), first aid kit, fire fighting equipment.
2. Attention to these conditions of the wastestream: cake consistency, density of centrifuged sludge, excessive leakage from packing, influent sludge concentration, pond depth.
3. Taking these laboratory samples: grab sample of cake, centrifuged sludge, or feed.
4. Operational adjustments of these components: sludge feed, coagulant feed, pool setting, water feed mixing with coagulant.
5. Using these tables, graphs, nomographs, and/or performing these calculations: percent recovery, cost per ton.
6. Essential use of these terms (not already implied): bowl.

NORMAL OPERATION skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S	→ R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The terms or descriptions (not already implied): furnace, combustion chamber.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: rake drive motor, fan and motor, conveyor belt, ash hopper, ash pump, wash water, gears, drive belt, rake, first aid kit.
2. Taking these laboratory samples: grab sample of influent, effluent.
3. Essential use of these terms (not already implied): plows, rabble arms.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

101 - Q

NORMAL OPERATION skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): industrial use, recreational use, process water.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: pumps, pipes, channels, bearings, valves, couplings, filters, first aid kit, fire fighting equipment.
2. Attention to these conditions of the wastestream: odor, color, turbidity, quantity suspended solids, floating materials.
3. Taking these laboratory samples: grab sample of effluent.
4. Operational adjustments of these components: flow rate control mechanisms, pressure control.
5. Using these tables, graphs, nomographs, and/or performing these calculations: flow rate, pounds of contaminants.

NORMAL OPERATION skill and knowledge for FLOW MEASUREMENT CMP UNIT . . .

R-10. Centralized recording and totalizing system including Parshall flume, venturi meter, magnetic flow meter, and rotameter

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT R-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): metering system.

RESPONSE DETAIL: For specific CMP UNIT R-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: Parshall flume (inc. stilling well, float, float switch flow indicator, transmitter), venturi meter (inc. flushing pump, sight glass, plunger, flow indicator transmitter), magnetic flow meter (inc. flow indicator, flow recorder, transmitter), rotameter (inc. flow indicator, flow recorder, transmitter), receivers, totalizers, pens, charts, means of transmission (electrical hydraulic, pneumatic, mechanical), signal converters.
2. Taking these types of actions: change charts, add ink, purge tubes, take readings, data evaluations.
3. Attention to these conditions of the wastestream: flow (high, low), floating materials, grease, debris (e.g., sand, rocks, sticks, etc.).
4. Operational adjustments of these components: adjust air rate, bleed moisture from air lines.
5. Using these tables, graphs, nomographs, and/or performing these calculations: calculating periodic totalizer differences.

NORMAL OPERATION skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S	→ R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): pumping system, piping system, pumping and piping system, hydraulic system; these specific pump names in conjunction with the names of the processes to which they are connected (raw sewage, sludge, process water, return sludge, organic return, priming, backwashing, proportional, recycle, recirculation, water seal, waste sludge, settled sewage); these specific valve names in conjunction with the names of the processes to which they are connected (inlet, suction, effluent, check, influent, discharge); these specific piping names in conjunction with the names of the process to which they are connected: line, sludge line, recycle line, bypass line, influent line, effluent line, overflow line, primary sludge line, recirculation line.

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 101-S

1. Attention to these components or characteristics of the unit: pump, couplings, speed controllers, control systems and activators, motors, diesels, pumping capacity, atypical noise or vibration, valves, piping, fittings, gages (e.g., vacuum, pressure, etc.), switches (e.g., variable speed, start, stop, etc.), pump temperature, seals, valves, temperature of pipeline, belts.
2. Taking these types of actions: tracing color coded piping; starting and stopping pumps, motors, engines; opening and closing valves; recording operational data; bleeding air; changing speed of pumps.
3. Attention to these conditions of the wastestream: excessive flow, excessive gases.
4. Using these tables, graphs, nomographs, and/or performing these calculations: volume of flow through a variable speed pump, gallons pumped per unit of time; brake horsepower; on variable speed units; pump curves.
5. Essential use of these terms (not already implied): static head, friction head, total dynamic head.

NORMAL OPERATION skill and knowledge for ELECTRIC POWER CMP UNIT . . .

T-10. System using delta transformers, generator, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): plant electrical system, internal electrical system, electrical supply, electrical distribution system, electrical service, electrical generation and distribution system, 3 phase, delta.

RESPONSE DETAIL: For specific CMP UNIT T-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: generator, exciter, diesel, power generation control center, primary feeder breaker (manually or electrically activated), primary, feeder transformer, load distribution panel or center, motor control center, magnetic starters (inc. contactor, coil push buttons, selector switches indicator lights, overload circuits), automatic control actuators (inc. floats, pressure switches, thermastats microswitches, timers), disconnect switches, ampmeters, voltmeters, watt-hour meters, elasped time meters, frequency meters, power factor meter, overvoltage relays, undervoltage relays, lighting transformers, emergency lighting system, transformer breaker, load bus, feeder breaker.

Continued on following page

Continued from previous page, Specific Behavior 101-T

2. Taking these types of actions: recording operational data, starting and stopping generator, switch to auxiliary fuel, switch to another power source, placing additional generator units into service, using auxilary feed, switching primary feeder line.
3. Operational adjustments of these components: adjust diesel speed to maintain proper frequency.
4. Using these tables, graphs, nomographs, and/or performing these calculations: power consumption, cost/KWHR, cost/day, fuel consumption.
5. Essential use of these terms (not already implied): total energy.

NORMAL OPERATION skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): digester gas system, plant gas system, process gas system, sludge gas system, low pressure gas system, high pressure gas system.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these components or characteristics of the unit: gas holder cover, meters, drip traps, moisture accumulator, valves (e.g., plug, pressure reducing, pressure relief, etc.), manometer, pressure gages, flame arrestors, primary gas receiver, gas booster (blower and motor, coupling, controls), secondary gas receiver, high and low pressure switches, gas filters, gas scrubbers, vacuum relief valves, waste gas burner explosion proof switch gear, gas storage sphere.
2. Taking these types of actions: recording operational data, start and stop booster blower, drain drip traps, start and stop high pressure blower.
3. Attention to these conditions of the wastestream: excessive moisture, gas pressure, gas composition.

Continued on following page

Continued from previous page, Specific Behavior 101-U

4. Taking these laboratory samples: grab sample of gas.
5. Using these tables, graphs, nomographs, and/or performing these calculations: gas production, gas consumption, gas reserve.

NORMAL OPERATION SPECIFIC BEHAVIOR for . . .

GENERAL CRITERION BEHAVIOR

102

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA
102 - A

NORMAL OPERATION skill and knowledge for COLLECTION CMP UNIT . . .

A-10. Combined system with industrial waste

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: inspection of sewers (e.g., interceptors, collectors, lateral, pressure, manholes, inverted siphon, dosing tank, regulators, weirs, and flap gate, etc.)
2. These terms or descriptions (not already implied): flushing tank.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: oxygen deficiency, toxic gases, traffic, open channels or pits, manhole covers, ladders, infection, flooding, cave-ins.
2. Attention to these high risk activities: working alone in manholes, entering or leaving manholes, working in excavations, cave-ins.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes or boots, gloves, hard hat, etc.), explocimeter, oxygen deficiency meter, ropes, harness, self-contained breathing apparatus, exhaust fans, blowers, explosion proof lights, traffic barriers, cones, flashing lights.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

102 - B

NORMAL OPERATION skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: operating hoist, starting-stopping chlorinator and evaporator, adjusting cam, connecting cylinders, testing for leaks.

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphragms, pig tails, and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails.
3. Use of these items of safety equipment: canister gas mask, self-contained air mask, chlorine cylinder leak repair kits for various size cylinders.

NORMAL OPERATION skill and knowledge for SCREENING AND GRINDING CMP UNIT . . .

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S $\longrightarrow$	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: checking and/or cleaning chain, sprockets, rake, rake drive, rake cleaner, screen belt, screen belt drive, bar screen enclosure, grinder and motor.

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, rakes, belts, shafts, couplings, grinder teeth, sprockets, etc.), slippery walks (e.g., grease, oil, ice, etc.), open doors or covers, electrical equipment, explosive fumes.
2. Attention to these high risk activities: making adjustments with switch in automatic position, entering deep wells.
3. Use of these items of safety equipment: protective clothing (e.g., rubber gloves, safety shoes or boots, hard hat, etc.), railings, stair safety treads, first aid kit.

NORMAL OPERATION skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S ⟶	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: cleaning equipment, emptying grit, adjusting valves, stopping and starting motors, changing speed of blower.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., buckets, chains, couplings), slippery walks (e.g., grease, oil, ice, etc.), open tanks, smooth treads, wet treads, electrical equipment, belts.
2. Attention to these high risk activities: working near or on moving parts, working in unventilated areas, hand removal of grease.
3. Use of these items of safety equipment: life preserver, protective clothing (e.g., safety shoes, glover, hard hat, etc.).

NORMAL OPERATION skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S	→ R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: operating flight, skimming grease, drawing sludge, cleaning weirs.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, belts, shafts, couplings, etc.), slippery walks and stairs (e.g., grease, oil, ice, etc.), pits, electrical equipment.
2. Attention to these high risk activities: working near open pits and tanks.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preservers, explosion proof flashlight, hand rails.

NORMAL OPERATION skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. Rotary distributor, standard rate unit with dosing tank

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: checking filter, checking dosing tank, checking filter distributors.

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) avove implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: slippery walks (e.g., grease, oil, ice, etc.), moving parts (e.g., pulleys, belts, fan, etc.).
2. Attention to these high risk activities: checking filter distributors.
3. Use of these items of safety equipment: safety treads on stairs and ladders, protective clothing (e.g., safety shoes, gloves, hard hat, etc.).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA | 102 - G

NORMAL OPERATION skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: washing aeration tank walls and channels; operation of motors, blowers, pumps; taking samples.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: wells, loose railings, electrical equipment, gratings, slippery walks (e.g., grease, oil, ice, etc.), rotating equipment.
2. Attention to these high risk activities: working near unrailed pits or wells.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preserver.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

102 - H

NORMAL OPERATION skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: operating flight, drawing sludge, cleaning weirs.

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, belts, shafts, couplings, etc.), slippery walks and stairs (e.g., grease, oil, ice, etc.), pits, electrical equipment.
2. Attention to these high risk activities: working near open pits and tanks.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preservers, explosion proof flashlight, hand rails.

NORMAL OPERATION skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: checking dikes for excessive vegetation or for holes caused by animals, checking for floating sludge pockets or debris adjacent to bank, checking electrical wires or tie downs for electric motor driven mixer, checking fence.

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: ground undermined, wet or damp grass or rocks, electrical wires in damp areas, poisons for control of plants and animals, stepping in chuck holes, contamination by contact.
2. Attention to these high risk activities: removal of vegetation by hoe adjacent to electrical wire, reaching over pond to remove debris.
3. Use of these items of safety equipment: fence, adequate lighting, signs, locks, electrical wire enclosed, fire fighting equipment, protective clothing (e.g., gloves, boots, etc.).

NORMAL OPERATION skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S	→ R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: operating skimmer, starting and stopping pumps, taking sludge samples.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: steps, pits, slippery floors and walks (e.g., grease, oil, ice, etc.), loose hand rails, moving parts (e.g., sprockets, chains, drive gears, belts, pulleys, etc.), electrical equipment, high water pressure equipment, gratings, high air pressure equipment and piping, wells, pits, tanks.
2. Attention to these high risk activities: operation of skimmers, screw.
3. Use of these items of safety equipment: protective clothing (e.g., rubber boots, gloves, hard hat, etc.).

NORMAL OPERATION skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: checking gas recirculation system, heat exchanger, pumps, or supernatant overflow, draining water traps.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), slippery walks or stairs (e.g., grease, oil, ice, etc.), fire, explosion.
2. Attention to these high risk activities: all activities around possible sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), vents, gas flame traps, pressure relief valves, no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, fire fighting equipment.

NORMAL OPERATION skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. *Floating cover unit with gas storage*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S $\longrightarrow$	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: checking pump, gas pressure or supernatant.

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), fire, explosion, slippery walks (e.g., grease, oil, ice, etc.).
2. Attention to these high risk activities: all activities around sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.) no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, flame trap, fire fighting equipment.

NORMAL OPERATION skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 101:

S →	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: testing, mixing, pumping.

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: acidic and alkaline solutions, spraying or splattering sludge and chemicals; rotating or oscillating equipment, slippery floors and catwalks (e.g., grease, oil, ice, etc.).
2. Attention to these high risk activities: mixing chemicals, pressurizing chemical storage containers.
3. Use of these items of safety equipment: face shields, protective clothing (e.g., safety shoes, hard hat, gloves, aprons, rubber boots, etc.), goggles, hoisting apparatus, boric acid and bicarbonate of soda solutions, eye wash stations, protective breathing apparatus.

NORMAL OPERATION skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. *Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S ⟶	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: operating hoist, starting-stopping chlorinator and evaporator, adjusting cam, connecting cylinders, testing for leaks, mixing buffer, calibrating analyzer.

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs, (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphrams, pig tails and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails.
3. Use of these items of safety equipment: canister gas mask; self-contained air mask; chlorine cylinder leak repair kits for various size cylinders.

NORMAL OPERATION skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These specific procedures: checking motors, agitator, conveyor belt, mixing tank stirrer.

--For specific CMP UNIT 0-11--

1. These specific procedures: checking pump, motor, variable speed drive, centrifuge.

RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice, etc.).
2. Use of these items of safety equipment: proper lighting, belt guards, railings, first aid kit, proper ventilation, fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, gloves, etc.).

--For specific CMP UNIT 0-11--

Continued on following page

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1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice, etc.).
2. Use of these items of safety equipment: proper lighting, belt guards, railings, first aid kit, proper ventilation, fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, gloves, etc.).

NORMAL OPERATION skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: checking conveyor, drive motor, fan and motor, ash pump.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., belts, gears, shafts, pulleys, etc.), heated parts.
2. Attention to these high risk activities: handling hot materials.
3. Use of these items of safety equipment: fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, asbestos gloves, etc.).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

102 - Q

NORMAL OPERATION skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: observing open channels.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: open channels, walks (e.g., grease, oil, ice, etc.), moving parts (e.g., belts, couplings, etc.).
2. Use of these items of safety equipment: rails, chains, life preservers, ropes, harnesses, protective clothing (e.g., safety shoes, gloves, hard hat, etc.).

NORMAL OPERATION skill and knowledge for FLOW MEASUREMENT CMP UNIT . . .

R-10. Centralized recording and totalizing system including Parshall flume, venturi meter, magnetic flow meter, and rotameter

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S	$\longrightarrow$ R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT R-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: reading meters and charts.

RESPONSE DETAIL: For specific CMP UNIT R-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: poorly ventilated or open pits.

NORMAL OPERATION skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: starting and stopping motors and engines; adjusting speed of pumps; opening, closing or adjusting valves.

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: loose clothing, slippery walks (e.g., grease, oil, ice, etc.), rotating and reciprocating parts; handling contaminated equipment, hot manifolds, engine noise.
2. Use of these items of safety equipment: protective clothing (e.g., safety shoes, hard hats, gloves, etc.), flashlights, first aid kit, fire fighting equipment, ear protection.

NORMAL OPERATION skill and knowledge for ELECTRIC POWER CMP UNIT . . .

T-10. *System using delta transformers, generator, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S ⟶	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: activating or deactivating circuits starting or stopping engines, taking engine readings, taking electrical readings.

RESPONSE DETAIL: For specific CMP UNIT T-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: electrical shock, thermal burns, noise, rotating equipment, flammable solvents, explosive atmosphere.
2. Attention to these high risk activities: activating or deactivating circuits.
3. Use of these items of safety equipment: pad locks, ear muffs or ear protector, rubber mats under all switch gear panels, explosion proof flashlight, protective clothing (e.g., rubber boots, safety shoes, rubber electrical gloves, insulated jacket, hard hat, etc.), first aid kit, fire fighting equipment, load break ratings on switch gear, shorting sticks.

NORMAL OPERATION skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 102:

S →	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: operating valves, lighting waste gas burner, inspecting rotating equipment, drawing drip traps.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: gas leakage, excessive high pressure, negative pressure, rotating equipment, abrasions to hands while turning valve handles or using valve chains, explosive mixtures.
2. Use of these items of safety equipment: explosion proof equipment, non-sparking tools, explosion meter, hydrogen sulfide amp tools, continuous operation gas monitor, first aid kit, fire fighting equipment, protective clothing (e.g., rubber gloves and boots, hard hat, etc.).

SPECIFIC BEHAVIOR for . . .

ABNORMAL OPERATION

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GENERAL CRITERION BEHAVIOR

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ABNORMAL OPERATION skill and knowledge for COLLECTION CMP UNIT . . .

A-10. Combined system with industrial waste

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: level (high, low), flow (high, low), temperature (high, low), pH (high, low), color, odor (e.g., H_2S, hydrocarbons, etc.), toxic gases, floating material, turbidity (high, low), or residual evidence of the above.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, sewer maintenance guides (e.g., WPCF Manual #7, etc.), industrial waste records, weather records, operating logs.
2. Taking these laboratory samples: grab samples for pH, H_2S, grit, floating material and settleable solids, industrial waste (e.g., metals, hydrocarbons, grease, etc.).

ABNORMAL OPERATION skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S ⟶	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: flow (high, low), toxic gases, long sewer runs, excessive industrial wastes, septic sewage, high temperature, odor (e.g., H_2S, hydrocarbons, etc.).

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF Manual #11, etc.), Chlorine Institute manual, operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab samples (before and after chlorination).

ABNORMAL OPERATION skill and knowledge for SCREENING AND GRINDING CMP UNIT . . .

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: color, odor (e.g., H_2S, hydrocarbons, etc.), floating material, debris (e.g., quality or quantity changes, etc.), septicity, industrial waste, flow (high, low).

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab and composite sample upstream of screens.

ABNORMAL OPERATION skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: temperature (high, low), solids (high, low), floating material, industrial discharge, flow (high, low), color, odor of liquid and grit, agitating velocity (high, low).

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Use of these types of information: laboratory results of chemical and mechanical analyses of grit.
3. Taking these laboratory samples: grab and composite samples of grit chamber influent and effluent (liquid and solids).

ABNORMAL OPERATION skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. *Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: oil, grease, gasoline, rags, sticks, high or low velocity, color, odor, floating material, temperature (high, low), sludge density (high, low), pH (high, low), solids concentration (high, low), BOD (high, low).

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF manual #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab and composite primary influent, grab and composite primary effluent, grab and composite raw sludge.

ABNORMAL OPERATION skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. Rotary distributor, standard rate unit with dosing tank

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: odor, flow (high, low), ponding, DO, pH (high, low), port stopped up, heads plugged, oil, filter flies, color (e.g., abnormal color of growth on media, etc.), icing conditions.

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF manual #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab sample of influent to trickling filter.
3. Essential use of these terms (not already implied): psychoda fly.

ABNORMAL OPERATION skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: froth, bulking, foam on aeration tank, DO (high, low), efficiency loss, loss of transparency in effluent, odor, solids (insufficient, excessive), pH.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF manual #11, etc.), operating logs, industrial waste records, inspection records.
2. Use of these types of information: air flow, return flow, wasting, sewage flow, BOD values, solids values, DO values, NO_3 values, plant laboratory records, past history.
3. Taking these laboratory samples: composite of aeration influent and effluent, composite of return sludge, profile samples throughout aeration tank length.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

201 - H

ABNORMAL OPERATION skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: oil, grease, gasoline, rags, sticks, high or low velocity, color, odor, floating material, sludge density (high, low), solids concentration (high, low), BOD (high, low), floc.

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab and composite of secondary influent and effluent, grab and composite of return activated sludge, surface grab sample.

ABNORMAL OPERATION skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S	→ R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: ice cover, temperature, variation in flow, loading, color, pH, odor, DO.

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11), operating logs, industrial waste records, inspection records, plant flow records, log sheets.
2. Taking these laboratory samples: grab or composite of pond influent and effluent.

ABNORMAL OPERATION skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: high solids concentration in influent and effluent, grease, sludge overflowing tank walls, frozen sludge blanket, excessive inorganic material, color, texture, imbalanced pressures, odor.
2. These terms or descriptions (not already implied): pressurizing tanks.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records, plant records, log sheets, detention time chart.
2. Taking these laboratory samples: timed grabbed influent sludge, effluent sludge, thickener overflow, and thickener underflow samples.

ABNORMAL OPERATION skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S	→ R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: temperature (rising, dropping), heat exchanger not lighting, pH (high, low), volatile acids rising, alkalinity falling, CO_2 content rising, gas production falling.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records, plant records, log sheets.
2. Taking these laboratory samples: grab sample of influent, sludge in tank, gas, grab sample of supernate.

ABNORMAL OPERATION skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. Floating cover unit with gas storage

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: solids high in supernatant, gas composition, volatile acids high, pH low, alkalinity low, high volatile content of digested sludge, temperature (high, low).

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab sample of influent, sludge in tank, supernatant, gas, and digested sludge.

ABNORMAL OPERATION skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: solids (high, low), unusual chemical composition, odorous conditions, excessive foaming, sludge too thick (will not flow), color, pH (high, low), alkalinity (high, low).

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11), operating logs, industrial waste records, inspection records, chemical manufacturers' handbooks, plant records, log sheets.
2. Taking these laboratory samples: grab sample of influent, effluent and supernatant.

ABNORMAL OPERATION skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: flow (high, low) toxic gases, long sewer runs, excessive industrial wastes, septic sewage, high temperature, odor (e.g., H_2S, hydro carbons, etc.), high BOD content, high solids content, high organic material load.
2. These terms or descriptions (not already implied): disinfection.

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF # 11, etc.), Chlorine Institute manual, operating logs, industrial waste records, inspection records, plant records.

Continued on following page

Continued from previous page, Specific Behavior 201-N

2. Taking these laboratory samples: grab samples (before and after chlornation).

ABNORMAL OPERATION skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These conditions or these indications thereof: cake peeling off, thin cake, high coagulant demand, high volatile content, high alkalinity, low solids, insufficient coagulant application, filtrate density, sludge concentration (high, low).

--For specific CMP UNIT 0-11--

1. These conditions or these indications thereof: sludge too wet, centrifuge too dark, insufficient coagulant application, sludge feed too fast, incorrect pond depth, sludge concentration.

RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 201-0

--For specific CMP UNIT 0-10--

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab sample of sludge feed or cake.

--For specific CMP UNIT 0-11--

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: grab sample of sludge feed, cake or filtrate.

ABNORMAL OPERATION skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: high moisture content, low calorific value.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.

ABNORMAL OPERATION skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: color, odor, quantity of floating materials, turbidity, loss of efficiency of process units or bypassing or malfunctioning thereof.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Use of these types of information: state or industrial water quality requirements, plant laboratory reports.
3. Taking these laboratory samples: grab sample of effluent.

GENERAL CRITERION BEHAVIOR 201 of the ABNORMAL OPERATION PROCEDURES category does not apply to the CMP UNIT of the FLOW MEASUREMENT process.

ABNORMAL OPERATION skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: excessive gases in wastestream; excessive flows (high, low).

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF #11, etc.), operating logs, industrial waste records, inspection records.
2. Use of these types of information: weather forecast, upstream monitoring.
3. Taking these laboratory samples: grab sample at location where problem is recognized.

GENERAL CRITERION BEHAVIOR 201 of the ABNORMAL OPERATION PROCEDURES category does not apply to the CMP UNIT of the ELECTRIC POWER process.

ABNORMAL OPERATION skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 201:

S →	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognzie the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: excessively low or negative pressure, excessively high pressure, low gas production, excessive moisture, change in gas composition, high hydrogen sulfide content, explosive mixture.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF Manual #11, etc.), operating logs, industrial waste records, inspection records.
2. Taking these laboratory samples: gas grab samples.

ABNORMAL OPERATION SPECIFIC BEHAVIOR for . . .

GENERAL CRITERION BEHAVIOR

202

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

202 - A

ABNORMAL OPERATION skill and knowledge for COLLECTION CMP UNIT . . .

A-10. *Combined system with industrial waste*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in level, flow, temperature, pH, color, odor, toxic gases, floating material, turbidity.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: oxygen deficiency, toxic gases, traffic, open channels or pits, manhole covers, ladders, infection, flooding, cave-ins, acid or caustic solutions, fast floating debris, submerged obstructions, special equipment (e.g., electrical power tools, heavy mechanical hoist, etc.).
2. Attention to these high risk activities: working alone in manholes, entering or leaving manholes, working in excavations, cave-ins, operating mechanical cleaning equipment, operating high pressure hydraulic cleaning equipment, operating any electrical equipment.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes or boots, gloves, hard hat, etc.), explocimeter, oxygen deficiency meter, ropes, harness, self-contained breathing apparatus, exhaust fans, blowers, explosion proof lights, traffic barriers, cone. flashing lights, protective clothing (e.g., goggles, etc.), fire fighting equipment.

ABNORMAL OPERATION skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal conditions in flow, toxic gases, sewer runs, industrial wastes, odor, septic sewage, high temperature.

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphragms, pig tails, and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug; chemical reactions, excessive chlorine feed rates.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails.
3. Use of these items of safety equipment: canister gas mask, self-contained air mask, fire fighting equipment.

ABNORMAL OPERATION skill and knowledge for SCREENING AND GRINDING CMP UNIT. . .

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S ⟶	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in color, odor, floating material, debris, (e.g., quantity or quality, etc.), septicity, industrial waste, flow, foreign objects on screen.

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, rakes, belts, shafts, couplings, grinder teeth, sprockets, etc.), slippery walks (e.g., grease, oil, ice, etc.), open doors or covers, electrical equipment, explosive fumes, toxic fumes, caustic waste, acid waste.
2. Attention to these high risk activities: making adjustments with switch in automatic position, entering deep wells, retrieving debris from channel.
3. Use of these items of safety equipment: protective clothing (e.g., rubber gloves, safety shoes or boots, hard hat, etc.), railings, stair safety treads, first aid kit.

ABNORMAL OPERATION skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S	→ R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in temperature, floating material, industrial waste color, odor, agitating velocity.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., buckets, chains, couplings, etc.), slippery walks (e.g., grease, oil, ice, etc.), open tanks, smooth treads, wet treads, electrical equipment, belts, water hose.
2. Attention to these high risk activities: working near or on moving parts, working in unventilated areas, hand removal of grease.
3. Use of these items of safety equipment: life preserver, protective clothing (e.g., safety shoes, gloves, hard hat, etc.).

ABNORMAL OPERATION skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal conditions in oil, grease, gasoline, rags, sticks, velocity, solids concentration, sludge density, color, odor, floating material, temperature, pH, BOD.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., buckets, chains, couplings, etc.), slippery walks and stairs (e.g., grease, oil, ice, etc.), open tanks, smooth treads, wet treads, electrical equipment, belts, water hose.
2. Attention to these high risk activities: working near open pits and tanks, raking floating materials (e.g., grease balls, rags, etc.) from weirs.
3. Use of these items of safety equipment: life preserver, protective clothing (e.g., safety shoes, gloves, hard hat, etc.), pits electrical equipment, ladders.

ABNORMAL OPERATION skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. Rotary distributor, standard rate unit with dosing tank

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting inappropriate condition in odor, flow, ponding, blocked port, color, plugged heads, oil, blow off pipe or siphon breaker, DO, pH, filter flies.

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: slippery walks (e.g., grease, oil, ice, etc.), moving parts (e.g., pulleys, blets, fan,etc.), insecure footing, moving rotary distributor.
2. Attention to these high risk activities: checking filter distributors, walking on media.
3. Use of these items of safety equipment: safety treads on stairs and ladders, protective clothing (e.g., safety shoes, gloves, hard hat, etc.).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

202 - G

ABNORMAL OPERATION skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in froth, bulking, foam in aeration tank, DO, efficiency, transparency, odor, solids concentration.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: wells, loose railings, electrical equipment, gratings, slippery walks (e.g., grease, oil, ice, etc.), rotating equipment.
2. Attention to these high risk activities: working near unrailed pits or wells.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preserver.

ABNORMAL OPERATION skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S	$\longrightarrow$ R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal conditions in oil, grease, gasoline, rags, sticks, velocity, solids concentration, sludge density, color, odor, floating material, temperature, pH, BOD.

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., buckets, chains, couplings, shafts, etc.), slippery walks (e.g., grease, oil, ice, etc.), pits, electrical equipement, belts, water hose.
2. Attention to these high risk activities: working near open pits and tanks, raking floating materials (e.g., grease balls, rags, etc.) from weirs.
3. Use of these items of safety equipment: life preserver, protecitve clothing (e.g., safety shoes, gloves, hard hat, etc.), explosion proof flashlight, hand rails.

ABNORMAL OPERATION skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting inappropriate condition of dike erosion, excessive algal material, terrestrial plants in abnormal clusters, excessive seepage, excessive debris, ice, temperature, flow, loading, color, pH, odor, DO

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: ground undermined, wet or damp grass or rocks, electrical wires in damp areas, poisons for control of plants and animals, stepping in chuck holes, contamination by contact.
2. Attention to these high risk activities: removal of vegetation by hoe adjacent to electrical wire, reaching over pond to remove debris, working from boat.
3. Use of these items of safety equipment: fence, adequate lighting, signs, locks, electrical wire enclosed, fire fighting equipment, protective clothing (e.g., gloves, boots), life preservers.

ABNORMAL OPERATION skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in solids, grease, sludge overflowing, frozen sludge, inorganic material, color, texture, pressure, odor, foreign material on overflow weirs and pumping equipment, flow rates, chains and belts.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: steps, pits, slippery floors and walks (e.g., grease, oil, ice, etc.), loose hand rails, moving parts (e.g., sprockets, chains, drive gears, belts, pulleys, etc.), electrical equipment, high water pressure equipment, gratings, high air pressure equipment and piping, wells, pits, tanks; pump components (e.g., impeller, etc.), weir setting device, high pressure blow off (inc. broken sight glass, pressure tank).
2. Attention to these high risk activities: operation of skimmers, screw.
3. Use of these items of safety equipment: protective clothing (e.g., rubber boots, gloves, hard hat, etc.).

ABNORMAL OPERATION skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in temperature, heat exchanger not lighting, pH, volatile acids, alkalinity, CO_2 content, gas production.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), slippery walks or stairs (e.g., grease, oil, ice, etc.), fire, explosion.
2. Attention to these high risk activities: all activities around possible sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), vents, gas flame traps, pressure relief valves, no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, fire fighting equipment.

ABNORMAL OPERATION skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. Floating cover unit with gas storage

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in solids, gases, volatile acids, volatile solids, pH, alkalinity, temperature.

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), fire, explosion, slippery walks (e.g., grease, oil, ice, etc.).
2. Attention to these high risk activities: all activities around sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, flame trap, fire fighting equipment, gas masks.

ABNORMAL OPERATION skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in solids content, chemical composition, odor, foam, sludge thickness, color, pH, alkalinity.

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: acidic and alkaline solutions, spraying or splattering sludge and chemicals; rotating or oscillating equipment, slippery floors and catwalks (e.g., grease, oil, ice, etc.).
2. Attention to these high risk activities: mixing chemicals, pressurizing chemical storage containers.
3. Use of these items of safety equipment: face shields, protective clothing (e.g., safety shoes, hard hat, gloves, aprons, rubber boots, etc.), goggles, hoisting apparatus, boric acid and bicarbonate of soda solutions, eye wash stations, protective breathing apparatus.

ABNORMAL OPERATION skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in flow, toxic gases, sewer runs, industrial wastes, odor, septic sewage, high temperature, "BOD content, solids content, organic load".

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphrams, pig tails and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails.
3. Use of these items of safety equipment: canister gas mask; self-contained air mask; chlorine cylinder leak repair kits for various size cylinders.

ABNORMAL OPERATION skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These specific procedures: correcting abnormal conditions in cake consistency, coagulant demand, volatile content, alkalinity, solids content.

--For specific CMP UNIT 0-11--

1. These specific procedures: correcting abnormal condition in sludge consistency, centrifuge too dark, coagulant demand, sludge feed, pond depth, sludge concentration.

RESPONSE DETAIL: The general stimulus (R) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice, etc.).
2. Use of these items of safety equipment: proper lighting, belt guards, railings, first aid kit, proper ventilation, fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, gloves, etc.).

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--For specific CMP UNIT 0-11--

1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice, etc.).
2. Use of these items of safety equipment: proper lighting, belt guards, railings, first aid kit, proper ventilation, fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, gloves, etc.).

ABNORMAL OPERATION skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in moisture content, calorific value.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., belts, gears, shafts, pulleys, etc.), heated parts.
2. Attention to these high risk activities: handling hot materials.
3. Use of these items of safety equipment: fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, asbestos gloves, etc.).

ABNORMAL OPERATION skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in color, odor, floating material, quantity, turbidity, efficiency.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: open channels, walks (e.g., grease, oil, ice, etc.), moving parts (e.g., belts, couplings, etc.).
2. Use of these items of safety equipment: rails, chains, life preservers, ropes, harnesses, protective clothing (e.g., safety shoes, gloves, hard hat, etc.).

GENERAL CRITERION BEHAVIOR 202 of the ABNORMAL OPERATION PROCEDURES category does not apply to the CMP UNIT of the FLOW MEASUREMENT process.

ABNORMAL OPERATION skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. *System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S →	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in flow, gases.

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: loose clothing, slippery walks (e.g., grease, oil, ice, etc.), rotating and reciprocating parts; handling contaminated equipment, hot manifolds, engine noise; flooding tunnels (e.g., floating debris, etc.), excessive heat and noise, electrical shock, toxic gases.

GENERAL CRITERION BEHAVIOR 202 of the ABNORMAL OPERATION PROCEDURES category does not apply to the CMP UNIT of the ELECTRIC POWER process.

ABNORMAL OPERATION skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 202:

S $\longrightarrow$	R
When considering the conduct of an actual, specific abnormal procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting abnormal condition in pressure, gas production, moisture content, gas consumed, H_2S content, explosive mixture.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: gas leakage, excessive high pressure, negative pressure, rotating equipment, abrasions to hands while turning valve handles or using valve chains, explosive mixtures, H_2S gas, disconnected pipelines, draining water from line.
2. Use of these items of safety equipment: explosion proof equipment, non-sparking tools, explosion meter, hydrogen sulfide amp tools, continuous operation gas monitor, first aid kit, fire fighting equipment, protective clothing (e.g., rubber gloves and boots, hard hat, etc.), high volume ventilation equipment.

SPECIFIC BEHAVIOR for . . .

PREVENTIVE MAINTENANCE

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PREVENTIVE MAINTENANCE skill and knowledge for COLLECTION CMP UNIT . . .

A-10. Combined system with industrial waste

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S ⟶	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): sewer, sewerage, sewer system, collection system, gravity flow system, force main system.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, sewer system map and specifications, inspection records.
2. Cleaning these components of the unit: sewers, manholes, inverted siphons, dosing tanks, regulators, weir flap gates, catch basins.
3. Painting these components of the unit: manholes, regulators, weirs, flap gates.
4. Lubrication of these components of the unit: regulators, flap gates.

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6. Using these tables, graphs, nomographs, and/or performing these calculations: flow nomographs for Kutter's equation and flow graphs.
7. Wear measurement for these components of the unit: structural damage and/or deterioration of sewers and manholes (invert, sides, and crown).
8. Mechanical adjustment of these components of the unit: regulators, weirs, flap gates.
9. Essential use of these terms (not already implied): TV inspection.

PREVENTIVE MAINTENANCE skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (s) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): upstream chlorination, remote chlorination, off plant chlorination, brand names.

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: cabinets, air filters, piping, valves, injectors, pens, rotameters, fans, flow rate controller.
3. Painting these components of the unit: piping, compressor, motor, air storage tank, cabinets.
4. Lubrication of these components of the unit: compressor, motor, recording instruments, hoist.

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5. Monitoring these components of the unit for proper operation: rotameter, regulator (e.g., chlorine pressure, injector vacuum, etc.), valves (e.g., header, pressure reducing, etc.), gas rate controller, pneumatic controller, gages (e.g., water, air, air storage tank, etc.), compressor, motor, charts, chart drive, hoist, pig tails, vent fan, pens, leak detection alarm system, evaporator, temperature controls, water level.
6. Wear measurement for these components of the unit: valves (e.g., header, pressure relief, etc.), chlorine pressure regulator, cam follower, injector, scales.
7. Mechanical adjustment of these components of the unit: pressure reducing valve, water pressure regulator, leak detector alarm system.
8. Replacement for these components of the unit: kinked pig tails, damaged header valves, air filters, compressor oil, leak detector components (e.g., paper, chemicals, photoelectric tubes, etc.).

PREVENTIVE MAINTENANCE skill and knowledge for SCREENING AND GRINDING CMP UNIT . . .

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): bar screen, screening device, screens, rack, brand names.

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: chain, rakes, screen housing, rails, troughs, ladders, channels, stairs, decks, hopper.
3. Painting these components of the unit: motor, gear box, bar screen enclosure, bars.
4. Lubrication of these components of the unit: gears, bearings, rollers, bushings, chains, sprockets, pulleys, speed reducers.

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5. Monitoring these components of the unit: bubbler control, motor, shear faces, alarm circuits, sensors, chain drive, proper operation.
6. Wear measurement for these components of the unit: chain (inc. chain links, link pins, cotter pins), sprocket teeth, grinder cutting teeth, bearings, bushings, belts, bars, lines.
7. Mechanical adjustment of these components of the unit: chain, drive belt, grinder cutting face, relays, belts, rakes, bubbler tubes, baffles.
8. Replacement for these components of the unit: chain (inc. links, link pins, cotter pins), belts, grinder cutting teeth.

PREVENTIVE MAINTENANCE skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): grit chamber, grit tank, grit collector, grit removal unit, brand names.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: tank when dewatered, receiving hopper, chains, sprockets, railings, walls of structure, weirs, grit removal assembly, unit appurtenances (e.g., rail, walkways, stairs, etc.), air cleaner, diffusers.
3. Painting these components of the unit: motors, gear boxes, mounts and frames, manifold, steel or iron body valves, walls, shafts, sprockets, piping (inc. diffuser), appurtenances to bucket drive assembly (e.g., chutes, hoppers, etc.), structure appurtenances (e.g., rail, walkways, stairs, ladders, etc.), air cleaner, diffusers.

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4. Lubrication of these components of the unit: motors, gear boxes, shafts (inc. bearings), dumping mechanism (bearing), tighteners (pivots and sprocket bearings), blower, blower gear box and bearings, rising stem valves, plug valves, oil damped drive chains, water lubricated bearings when tank is dewatered.
5. Monitoring these components of the unit for proper operation: electric motors (temperature, atypical sound, amperage), electric control equipment (atypical sound, temperature), gear boxes (lubrication, temperature, sound), chains (wear, sound, deformation), buckets (wear, deformation, corrosion), shoes (wear, corrosion), check valves, air pressure relief, silencer, pressure indicating device.
6. Wear measurement for these components of the unit: V-belt, drive pulleys, railings, shoes, buckets, bearings, shafts, hopper walls.
7. Mechanical adjustment of these components of the unit: operating speed changer to prevent freezing up, belt tighteners.
8. Replacement for these components of the unit: valve packings, lubrication oil, air cleaner elements, belts, diffusers.

PREVENTIVE MAINTENANCE skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): primary, clarifier, sedimentation unit, primary basin, settling tank, and appropriate combinations thereof.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed performance guides, operator manuals (e.g., WPCF manual #11, etc.), operating logs, industrial waste records, inspection records.
2. Cleaning these components of the unit: pumps, motors, floors, walls, flights, drive unit, grease trough, weirs, flow channel, telescopic valves, inlet trough.
3. Painting these components of the unit: pumps, motors, floors, walls, drive unit, weirs, telescopic valves, inlet trough, all related metal appurtenances (e.g., hand rails, light standards).

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4. Lubrication of these components of the unit: pumps, motors, drive clutch, skimmer, speed reducers, shaft bearings.
5. Attention to these components or characteristics of the unit: gear box, shaft bearings, packing.
6. Monitoring these components of the unit for proper operation: telescopic valves, flights, time clock, density meter unit, pumps, motors, water seal unit.
7. Wear measurement for these components of the unit: drive unit clutch, chain, sprocket, flight shoes and tracks, flights, pump and drive belts.
8. Mechanical adjustment of these components of the unit: flight and drive chain idler sprocket, density meter, drive belt, shear pin protecting device.
9. Replacement for these components of the unit: belts.

PREVENTIVE MAINTENANCE skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. *Rotary distributor, standard rate unit with dosing tank*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): trickling filter (e.g., high rate, etc.), filter, filter bed, bacteria bed, forced air filter, brand names.

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: dosing tank (inc. interior walls, piping), ports, nozzles, underdrains, rotary distributor, screens.
3. Painting these components of the unit: rotary distributor, dosing tank (inc. piping bell), concrete structures below sewage level.
4. Lubrication of these components of the unit: rotary distributor, fan, motor bearings, fan bearings.

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5. Attention to these components or characteristics of the unit: mercury seal, bearings, guy lines.
6. Monitoring these components of the unit for proper operation: dosing tank, rotary distributor, fan and drive unit.
7. Mechanical adjustment of these components of the unit: distributor arms.
8. Replacement for these components of the unit: fan belts, motor bearings.
9. Essential use of these terms (not already implied): deflector plates.

PREVENTIVE MAINTENANCE skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): activated sludge, conventional aerator, brand names.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: blowers, motors, valves (e.g., gate, plug, ball, check, etc.), piping, floors, walls, manometers, cabinets, pumps, flow channels, diffuser tubes.
3. Painting these components of the unit: blowers, motors, valves, piping, pumps, hand rails, cabinets.
4. Lubrication of these components of the unit: blowers, motors, valves, pumps, swing joints.

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5. Monitoring these components of the unit for proper operation: flow meters, manometers, blower meters, tachometers, indicator lights, diffusers, indicating gages (e.g., oil pressure, temperature, etc.).
6. Replacement for these components of the unit: diffuser tubes.

PREVENTIVE MAINTENANCE skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): sedimentation unit, secondary basin, settling tank, final clarifier and appropriate combinations thereof, brand names.

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: pumps, motors, floors, walls, flights, drive unit, weirs, flow channel, telescopic valves, inlet trough, skimming device.
3. Painting these components of the unit: pumps, motors, flights, drive unit, weirs, surface structures, collector mechanism, piping, valves, hand rails, light standards.
4. Lubrication of these components of the unit: pumps, motors, drive clutch, speed reducers, shaft bearings, gears.

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5. Attention to these components or characteristics of the unit: gear box, shaft bearings, packing.
6. Monitoring these components of the unit for proper operation: telescopic valves, flights, time clock, density meter unit, pumps, motors, water seal unit, suction arms.
7. Wear measurement for these components of the unit: gears, bearings, pumps, drive belts, shoes, chains.
8. Mechanical adjustment of these components of the unit: flight and drive chain idler sprocket, density meter, drive belt, shear pin protecting device, suction arm supports.
9. Replacement for these components of the unit: belts.

PREVENTIVE MAINTENANCE skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): oxidation pond, sewage lagoon, waste stabilization lagoons, polishing lagoons, brand names.

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: grounds, dikes, gates, fence area, lights, switches, tools, pumps, motors, enclosures.
3. Painting these components of the unit: materials building, motors, pumps.
4. Lubrication of these components of the unit: motors, pumps, gate operators.

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5. Monitoring these components of the unit for proper operation: motors, pumps, valves, diversion box, samplers.
6. Wear measurement for these components of the unit: dikes (erosion).
7. Mechanical adjustment of these components of the unit: valves, diversion box.

PREVENTIVE MAINTENANCE skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): thickener, sludge dewatering device, floatation device, brand names.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: pumps, piping, walls, floors, skimmers, recording equipment, metering devices, windows, valves, pressure tanks, compressors, gear box.
3. Painting these components of the unit: pumps, motors, piping, walls, skimmers, valves, pressure tanks, compressors, gear box.
4. Lubrication of these components of the unit: pumps, motors, valves, skimmer track, sprockets and chain, gear box, compressor, screw.

Continued on following page

Continued from previous page, Specific Behavior 301-J

5. Monitoring these components of the unit for proper operation: air compressor control board, pump aeration, solids overflow, automatic pressure tank controls, screw, skimmer, metering devices, valves (e.g., check, butterfly, etc.).
6. Using these tables, graphs, nomographs, and/or performing these calculations: ft^3/air/lb solids removed.
7. Wear measurement for these components of the unit: pump stuffing box, pressure relief systems, chain, sprocket, skimmer.
8. Mechanical adjustment of these components of the unit: pump packing gland, pressure regulators, skimmer speed, sprockets.
9. Replacement for these components of the unit: air filters, oil filters, oil.

PREVENTIVE MAINTENANCE skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or description (not already implied): anaerobic digester, sludge digester, digestion tank.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: pumps, motors, piping, valves, sight glasses, hatches.
3. Painting these components of the unit: exposed metal (e.g., pumps, motors, piping, valves, etc.).
4. Lubrication of these components of the unit: compressor, pumps, motors, valves, pulleys.

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5. Monitoring these components of the unit for proper operation: gages, variable speed drive, supernatant overflow, gas recirculation system, heat exchanger, pilot light assembly, recirculation pumps, meters, relief valves, water traps.
6. Wear measurement for these components of the unit: belts.
7. Mechanical adjustment of these components of the unit: valves, pumps, meters.
8. Replacement for these components of the unit: belts.

PREVENTIVE MAINTENANCE skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. Floating cover unit with gas storage

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): anaerobic digester, sludge digester, digestion tank.

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive manintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: pumps, motors, piping, valves, sight glasses, hatches.
3. Painting these components of the unit: any components with exposed metal (e.g., pumps, motors, etc.).
4. Lubrication of these components of the unit: pump, motor, valves.

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5. Monitoring these components of the unit for proper operation: variable speed drive, manometer, vacuum-pressure relief valve, floating cover.
6. Using these tables, graphs, nomographs, and/or performing these calculations: solids retention time, lb. volatile solids/ft.^{3}/day.
7. Wear measurement for these components of the unit: belt.
8. Mechanical adjustment of these components of the unit: manometer, pumps.
9. Replacement for these components of the unit: belt.

PREVENTIVE MAINTENANCE skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S ⟶	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): chemical conditioning, coagulation, flocculation sludge conditioning, elutriation, counter-current elutriation.

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: chemical mixing tanks, mixers, catwalks, floors, walls, weirs, chennels, gear box, motor, pumps, flights, collector, tank.
3. Painting these components of the unit: floors, walls, catwalks, hand rails, gear box, motor, pumps.
4. Lubrication of these components of the unit: motor, gear box, mixers, pumps, chains, bucket elevators, piping, valves.

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5. Monitoring these components of the unit for proper operation: rotameter, flow charts, pumping rates, collector mechanism, proportional flow controls, overload alarms.
6. Using these tables, graphs, nomographs, and/or performing these calculations: GPM of sludge and chemicals, pounds/min. of sludge and chemicals, dewatering.
7. Wear measurement for these components of the unit: belts, pulleys, proportional flow controls, sprockets, chains, rails, shoes.
8. Mechanical adjustment of these components of the unit: collector drive chain, belt tension.
9. Replacement for these components of the unit: sprockets, chains, shear pins, belts.

PREVENTIVE MAINTENANCE skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S ⟶	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): upstream chlorination, remote chlorination, off plant chlorination, brand names.

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: cabinets, air filters, piping, valves, injectors, pens, rotameters, fans, flow rate controller, tubes, filters.
3. Painting these components of the unit: piping, compressor, motor, air storage tank, cabinets.
4. Lubrication of these components of the unit: compressor, motor, recording instruments, hoist.

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5. Monitoring these components of the unit for proper operation: rotameter, regulator (e.g., chlorine pressure, injector vacuum, etc.), valves (e.g., header pressure reducing, etc.), gages (e.g., water, air, air storage tank, etc.), gas rate controller, pneumatic controller, compressor, motor, charts, chart drive, hoist, pig tails, vent fan, pens, leak detection alarm system, evaporator, temperature controls, water level, analyzer.
6. Wear measurement for these components of the unit: valves (e.g., header, pressure relief, etc.), chlorine pressure regulator, cam follower, injector, scales.
7. Mechanical adjustment of these components of the unit: pressure reducing valve, water pressure regulator, leak detector alarm system, analyzer.
8. Replacement for these components of the unit: kinked pig tails, damaged header valves, air filters, compressor oil, leak detector components (e.g., paper, chemicals, photoelectric tubes, etc.), buffer solution.

PREVENTIVE MAINTENANCE skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. *Vacuum filter unit with cloth*

0-11. *Continuous feed centrifuge unit*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These terms or descriptions (not already implied): vacuum filtration.

RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: blower, pumps, motors, scrapers, rollers, tank.
3. Painting these components of the unit: exposed metal (e.g., pumps, motors, tanks, valves, etc.).

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4. Lubrication of these components of the unit: blower, pumps, motors, variable speed drive, pulleys, trunnion.
5. Monitoring these components of the unit for proper operation: vacuum gage, agitator, chemical conditioning apparatus, rotameters, mixing tank.
6. Wear measurement for these components of the unit: belts.
7. Mechanical adjustment of these components of the unit: vacuum gage, rollers, scrapers, chemical conditioning apparatus, mixing tank, valves, motors.
8. Replacement for these components of the unit: belts.

--For specific CMP UNIT 0-11--

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: pumps, motors, centrifuge.
3. Painting these components of the unit: pumps, motors.
4. Lubrication of these components of the unit: pumps, motors, variable speed drive, pulley, centrifuge.
5. Monitoring these components of the unit for proper operation: pressure gage, variable speed drive.
6. Wear measurement for these components of the unit: belts.
7. Mechanical adjustment of these components of the unit: belts, pressure gage, variable speed drive.
8. Replacement for these components of the unit: belts.

PREVENTIVE MAINTENANCE skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): furnace, combustion chamber.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: motor, fan, pump, hopper.
3. Painting these components of the unit: all exposed metal (e.g., motor, pump).
4. Lubrication of these components of the unit: pumps, motors, gears, conveyor, rollers.
5. Monitoring these components of the unit for proper operation: gears.

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6. Wear measurement for these components of the unit: drive belt.
7. Mechanical adjustment of these components of the unit: conveyor belt.

PREVENTIVE MAINTENANCE skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q 10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): industrial use, recreational use, process water.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: pumps, piping, channels, filters.
3. Painting these components of the unit: pumps, piping, channels.
4. Lubrication of these components of the unit: process pumps and valves.
5. Monitoring these components of the unit for proper operation: bearings, valves.
6. Wear measurement for these components of the unit: couplings.

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7. Mechanical adjustment of these components of the unit: packing.
8. Replacement for these components of the unit: bearings, pipes, valves, couplings.

PREVENTIVE MAINTENANCE skill and knowledge for FLOW MEASUREMENT CMP UNIT . . .

R-10. *Centralized recording and totalizing system including Parshall flume, venturi meter, magnetic flow meter, and rotameter*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT R-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): metering system

RESPONSE DETAIL: For specific CMP UNIT R-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: stilling wells, pens, sight glasses, meter bore, ports, floats, strainers, housing.
3. Painting these components of the unit: piping, housing.
4. Lubrication of these components of the unit: cams, mechanical linkage.
5. Monitoring these components of the unit for proper operation: Parshall flumes, venturi meter, magnetic flow meter, rotameter, receivers, totalizers, transmitters, converters, recorders.

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6. Using these tables, graphs, nomographs, and/or performing these calculations: flow nomographs, calibration nomograph.
7. Wear measurement for these components of the unit: cams.
8. Mechanical adjustment of these components of the unit: float switch, attachment mechanism, calibration.
9. Replacement for these components of the unit: switches, cams, lights, pens, electronic components.

PREVENTIVE MAINTENANCE skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. *System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): pumping system, piping system, pumping and piping system, hydraulic system; these specific pump names in conjunction with the names of the processes to which they are connected (raw sewage, sludge, process water, return sludge, organic return, priming, backwashing, proportional, recycle, recirculation, water seal, waste sludge, settled sewage); these specific valve names in conjunction with the names of the processes to which they are connected (inlet, suction, effluent, check, influent, discharge); these specific piping names in conjunction with the names of the process to which they are connected: line, sludge line, recycle line, bypass line, influent line, effluent line, overflow line, primary sludge line, recirculation line.

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

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1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: pump (inc. base, bearing frame, motor, casing), diesel engine and appurtenances, valves, piping, speed reducer.
3. Painting these components of the unit: all exterior parts of pump, motor, diesel engine, speed reducer; all piping, valves and fittings.
4. Lubrication of these components of the unit: bearings, seals, diesel engine, valves, motors.
5. Monitoring these components of the unit for proper operation: pumps (inc. bearings and seals), speed reducers, motors, engines, automatic control actuators, control system, alarm system, valve position indicators.
6. Using these tables, graphs, nomographs, and/or performing these calculations: pump curves (e.g., horsepower, efficiency, heads, etc.), diesel curves (e.g., horsepower-speed, etc.).
7. Wear measurement for these components of the unit: bearings, seals, wear rings, shaft play, belt tension, impeller condition, alignment (both angular and parallel), shaft sleeve, check valve (inc. balls, disk), air chamber, cone valve, pump casing.
8. Mechanical adjustment of these components of the unit: packing, shaft play, belt tension, alignment, cone valve timing.
9. Replacement for these components of the unit: packing, lubricating oil, filters (e.g., oil, air, water, etc.), belts, gaskets, seals, injectors, spark plugs.

PREVENTIVE MAINTENANCE skill and knowledge for ELECTRIC POWER CMP UNIT . . .

T-10. *System using delta transformers, generator, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): plant electrical system, internal electrical system, electrical supply, electrical distribution system, electrical service, electrical generation and distribution system, 3 phase, delta.

RESPONSE DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: generator, exciter, diesel, power generation control center, primary feeder breaker (manually or electrically activated), primary, feeder transformer, load distribution panel or center, motor control center, magnetic starters (inc. contactor, coil push buttons, selector switches indicator lights, over-

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load circuits), automatic control actuators (inc. floats, pressure switches, thermastats microswitches, timers), disconnect switches ampmeters, voltmeters, watt-hour meters, elasped time meters, frequency meters, power factor meter, overvoltage relays, undervoltage relays. lighting transformers, emergency lighting system, transformer breaker, load bus, feeder breaker, surrounding areas.

3. Painting these components of the unit: generator, exciter, diesel, transformer cases, electrical conduit and control boxes which are exposed to the elements.
4. Lubrication of these components of the unit: generator, exciter, diesel engine.
5. Monitoring these components of the unit for proper operation: generator, exciter, diesel, power generation control center, primary feeder breaker (manually or electrically activated), primary feeder transformer, transformer breaker, load bus, feeder breaker load distribution panel or center, motor control center, magnetic starters (inc. contactor, coil push buttons, selector switches indicator lights, overload circuits), automatic control actuators (inc. floats, pressure switches, thermastats, microswitches, timers), disconnect switches, ampmeters, voltmeters, watt-hour meters, elasped time meters, frequency meters, power factor meter, overvoltage relays, undervoltage relays, lighting transformers, emergency lighting system, checking systme, individual equipment, and ground systems.
6. Wear measurement for these components of the unit: generator, exciter, diesel, primary feeder breaker (inc. batteries if electrically activated), magnetic starters (inc. contactor, coil, current drawn by unit), megging insulation, calibration of meters, and overvoltage and undervoltage relays.
7. Mechanical adjustment of these components of the unit: generator, exciter, diesel.
8. Replacement for these components of the unit: indicator light bulbs, oil in transformers.

PREVENTIVE MAINTENANCE skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 301:

S →	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These terms or descriptions (not already implied): digester gas system, plant gas system, process gas system, sludge gas system, low pressure gas system, high pressure gas system.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: employee developed preventive maintenance schedules, manufacturers' maintenance guides, plant drawings and specifications, inspection records.
2. Cleaning these components of the unit: drip traps, moisture accumulator, valves (e.g., pressure reducing, pressure relief, vacuum relief, etc.), pressure gages, flame arrestos, gas booster blower unit (inc. motor, blower, coupling, controls), pressure switches, gas filters, gas scrubbers, meters, rotary positive displacement blower and motor, gas storage sphere.

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3. Painting these components of the unit: exteriors of drip traps, moisture accumulator, valves (e.g., pressure reducing, pressure relief, vacuum relief, etc.), flame arrestos, gas blower unit (inc. motor, blower), gas filters, gas scrubbers, meters, rotary positive displacement blower and motor, gas storage sphere.
4. Lubrication of these components of the unit: gas booster blower unit, meters, valves, rotary positive displacement, blower unit.
5. Monitoring these components of the unit for proper operation: standby equipment. pressure switches, meters, valves, blowers, boosters, compressors.
6. Wear measurement for these components of the unit: booster, blades, compressor vanes.
7. Mechanical adjustment of these components of the unit: drip traps, pressure reducing valves, pressure switches, meters.
8. Replacement for these components of the unit: gas scrubber contents, filters, vanes on rotary unit.

PREVENTIVE MAINTENANCE SPECIFIC BEHAVIOR for . . .

GENERAL CRITERION BEHAVIOR

302

PREVENTIVE MAINTENANCE skill and knowledge for COLLECTION CMP UNIT . . .

A-10. Combined system with industrial waste

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., sewers, manholes, etc.), all painting (e.g., manholes, regulators, etc.), all lubrications (e.g., regulators, flap gates, etc.), all monitoring (e.g., sewers, manholes, etc.), all mechanical adjustments (e.g., regulators, weirs, etc.).

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: oxygen deficiency, toxic gases, traffic, open channels or pits, manhole covers, ladders, infection, flooding, cave-ins, rotating and reciprocating equipment.
2. Attention to these high risk activities: working alone in manholes, entering or leaving manholes, working in excavations, cave-ins.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes or boots, gloves, hard hat, etc.), explocimeter, oxygen deficiency meter, ropes, harness, self-contained breathing apparatus, exhaust fans, blowers, explosion proof lights, traffic barriers, cones, flashing lights.

PREVENTIVE MAINTENANCE skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. *Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S $\longrightarrow$	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., air filters, piping, etc.), all painting (e.g., piping, compressors, etc.), all lubrication (e.g., compressors, motors, etc.), all monitoring (e.g., rotameter, regulators, etc.), all mechanical adjustments (e.g., injector vacuum regulator, etc.).

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphragms, pig tails, and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug; electrical equipment; chlorine in piping and equipment; opening piping and equipment.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails.
3. Use of these items of safety equipment: canister gas mask, self-contained air mask.

PREVENTIVE MAINTENANCE skill and knowledge for SCREENING AND GRINDING CMP UNIT . . .

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., chain, rake, etc.), all painting (e.g., motor, gear box, etc.), all lubrications (e.g., gears, bearings, etc.), all monitoring (e.g., bubbler control, etc.), all mechanical adjustments (e.g., chain slack, drive belt tension, etc.).

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, rakes, belts, shafts, couplings, grinder teeth, sprockets, etc.), slippery walks (e.g., grease, oil, ice, etc.), open doors or covers, electrical equipment, explosive fumes.
2. Attention to these high risk activities: making adjustments with switch in automatic position, entering deep wells.
3. Use of these items of safety equipment: protective clothing (e.g., rubber gloves, safety shoes or boots, hard hat, etc.), railings, stair safety treads, first aid kit, electrical lockout tags and keys.

PREVENTIVE MAINTENANCE skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., chains, weirs, etc.), all painting (e.g., motors, gear boxes, etc.), all lubrications (e.g., motors, gear boxes, etc.), all monitoring (e.g., control equipment, etc.), all mechanical adjustments (e.g., shoes, shafts, etc.).

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., buckets, chains, couplings, etc.), slippery walks (e.g., grease, oil, ice, etc.), open tanks, smooth treads, wet treads, electrical equipment, belts.
2. Attention to these high risk activities: working near or on moving parts, working in unventilated areas, hand removal of grease.
3. Use of these items of safety equipment: life preserver, protective clothing (e.g., safety shoes, gloves, hard hat, etc.).

PREVENTIVE MAINTENANCE skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pumps, motors, etc.), all painting (e.g., hand rails, walls, pumps, etc.), all lubrications (e.g., pumps, motors, etc.), all inspections (e.g., gear box, etc.), all monitoring (e.g., flight, pumps, etc.), all measurements for wear (e.g., chains, sprockets, etc.), all mechanical adjustments (e.g., drive belt, density meters, etc.).

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, belts, shafts, couplings, etc.), slippery walks and stairs (e.g., grease, oil, ice, etc.), pits, water hose, electrical equipment, belts, ladders.
2. Attention to these high risk activities: working near open pits and tanks, raking floating materials (e.g., grease belts, rags, etc.), from weirs.
3. Use of these items of safety equipment: life preserver, protective clothing (e.g., safety shoes, gloves, hard hat, etc.), boots, explosion proof flashlights, hand rails.

PREVENTIVE MAINTENANCE skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. Rotary distributor, standard rate unit with dosing tank

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., dosing tank, ports, etc.), all painting (e.g., rotary distributor, dosing tank, etc.), all lubrications (e.g., rotary distributor, etc.), all mechanical adjustments (e.g., distributor arms, etc.).

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: slippery walks (e.g., grease, oil, ice, etc.), moving parts (e.g., pulleys, belts, fan, etc.), paint fumes, mercury.
2. Attention to these high risk activities: checking filter distributors.
3. Use of these items of safety equipment: safety treads on stairs and ladders, protective clothing (e.g., safety shoes, gloves, hard hats, boots, etc.).

PREVENTIVE MAINTENANCE skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S ⟶	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., blowers, motors, etc.), all painting (e.g., pumps, piping, etc.), all lubrication (e.g., blowers, motors, etc.), all monitoring (e.g., meters, diffusers, etc.), all inspections (e.g., diffuser tubes, etc.).

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: wells, loose railings, electrical equipment, gratings, slippery walks (e.g., grease, oil, ice, etc.), rotating equipment.
2. Attention to these high risk activities: working near unrailed pits or wells.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preserver.

PREVENTIVE MAINTENANCE skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S ⟶	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pumps, motors, etc.), all painting (e.g., hand rails, walls, pumps, etc.), all lubrications (e.g., pumps, motors, etc.), all inspections (e.g., gear box, etc.), all monitoring (e.g., flight, pumps, etc.), all measurements for wear (e.g., chains, sprockets, etc.), all mechanical adjustments (e.g., drive belt, density meters, etc.).

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, belts, shafts, couplings, etc.), slippery walks and stairs (e.g., grease, oil, ice, etc.), pits electrical equipment, moving suction arms, paint fumes.
2. Attention to these high risk activities: working near open pits and tanks.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preservers, expolsiton proof flashlight, hand rails.

PREVENTIVE MAINTENANCE skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., grounds, dikes, etc.), all painting (e.g., materials building, motors, etc.), all lubrications (e.g., pumps, motors, etc.), all monitoring (e.g., valves, etc.), all mechanical adjustments (e.g., valves, etc.).

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: ground undermined, wet or damp grass or rocks, electrical wires in damp areas, poisons for control of plants and animals, stepping in chuck holes, contamination by contact, boat and motor, rodents, herbicides and soil sterilizers, chuck holes, holes in fence, electrical shock, slippery dikes, nongrounded control panel.
2. Attention to these high risk activities: removal of vegetation by hoe adjacent to electrical wire, reaching over pond to remove debris.
3. Use of these items of safety equipment: fence, adequate lighting, signs, locks, electrical wire enclosed, fire fighting equipment, protective clothing (e.g., gloves, boots, etc.), adequate fencing and signs, safety of equipment in boat.

PREVENTIVE MAINTENANCE skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pumps, floors, etc.), all painting (e.g., pumps, motors, etc.), all lubrications (e.g., pumps, motors, etc.), all monitoring (e.g., air compressor, control board, etc.), all mechanical adjustments (e.g., pump packing gland, etc.).

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: steps, pits, slippery floors and walks (e.g., grease, oil, ice, etc.), loose hand rails, moving parts (e.g., sprockets, chains, drive gears, belts, pulleys, etc.), electrical equipment, high water pressure equipment, gratings, high air pressure equipment and piping, wells, pits, tanks, pump components (e.g., impeller, etc.), weir setting device, high pressure blow off (inc. broken sight glass, pressure tank).
2. Attention to these high risk activities: operation of skimmers, screw, moving shafts.
3. Use of these items of safety equipment: protective clothing (e.g., rubber boots, gloves, hard hat, etc.), explosion proof electrical equipment.

PREVENTIVE MAINTENANCE skill and knowledge for FIRST STAGE DIGESTION CMP UNIT...

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pumps, motors, etc.), all painting (e.g., compessors, valves, etc.), all lubrications (e.g., pumps, motors, etc.), all monitoring (e.g., recirculation systems, relief valves, etc.), all mechancial adjustments (e.g., valves, meters, etc.).

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), slippery walks or stairs (e.g., grease, oil, ice, etc.), fire, explosion.
2. Attention to these high risk activities: all activities around possible sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), vents, gas flame traps, pressure relief valves, no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, fire fighting equipment, explosion proof hand tools.

PREVENTIVE MAINTENANCE skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. Floating cover unit with gas storage

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pumps, motors, etc.), painting (e.g. pumps, motors, etc.), all lubrications (e.g., pumps, motors, etc.), all monitoring (e.g., variable speed drive, manometers, etc.), all mechanical adjustments (e.g. manometers, pumps, etc.), all inspections (e.g., belts, etc.).

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), fire, explosion, slippery walks (e.g., grease, oil, ice, etc.).
2. Attention to these high risk activities: all activities around sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, flame trap, fire fighting equipment, gas mask, explosion proof hand tools.

PREVENTIVE MAINTENANCE skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropirate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., mixers, weirs, etc.), all painting (e.g., floors, walls, etc.), all lubrications (e.g., motor gear box, etc.), all monitoring (e.g., rotameter, flow charts, etc.), all inspections (e.g., belts, pulleys, etc.), all mechanical adjustments (e.g., chains, belts, etc.).

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: acidic and alkaline solutions, spraying or splattering sludge and chemicals, rotating or oscillating equipment, slippery floors and catwalks (e.g., grease, oil, ice, etc.), ladders, stairs, loose hand rails, moving parts (e.g., chains, gears, belts, pulleys, blades, etc.), wells, pits, tanks.
2. Attention to these high risk activities: mixing chemicals, pressurizing chemical storage containers.
3. Use of these items of safety equipment: face shields, protective clothing (e.g., safety shoes, hard hat, gloves, aprons, rubber boots, etc.), goggles, hoisting apparatus, boric acid and bicarbonate of soda solutions, eye wash stations, protective breathing apparatus.

PREVENTIVE MAINTENANCE skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. *Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., air filters, piping, etc.), all painting (e.g., piping compressors, etc.), all lubrications (e.g., compressors, motors, etc.), all monitoring (e.g., rotameter, regulators, etc.), all mechanical adjustments (e.g., injector vacuum regulator, etc.).

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphrams, pig tails and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug; electrical equipment; chlorine in piping and equipment; opening piping and equipment.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails.
3. Use of these items of safety equipment: canister gas mask; self-contained air mask.

PREVENTIVE MAINTENANCE skill and knowledge for SLUDGE DEWATERING CMP UNITS...

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These specific procedures: all cleaning (e.g., blower, pumps, etc.), all painting (e.g., pumps, motors, etc.), all lubrications (e.g., pumps, pulleys, etc.), all monitoring (e.g., mixing tank, agitator, etc.), all mechanical adjustments (e.g., belts, scrapers, etc.), all inspections (e.g., belts, etc.).

--For specific CMP UNIT 0-11--

1. These specific procedures: all cleaning (e.g., pumps, motors, etc.), all painting (e.g., pumps, motors, etc.), all lubrications (e.g., pumps, pulleys, etc.), all monitoring (e.g., pressure gage, variable speed drive, etc.), all mechanical adjustments (e.g., belts, pressure gage, etc.), all inspections (e.g., belts, etc.).

RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice).

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--For specific CMP UNIT 0-11--

1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice).

PREVENTIVE MAINTENANCE skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pumps, motors, etc.), all painting (e.g., pumps, motors, etc.), all lubrications (e.g., motors, gears, etc.), all monitoring (e.g., gears, etc.), all inspections (e.g., belts, etc.).

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., belts, gears, shafts, pulleys, etc.), heated parts, flammable paint.
2. Attention to these high risk activities: handling hot materials.
3. Use of these items of safety equipment: fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, asbestos gloves, etc.).

PREVENTIVE MAINTENANCE skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S $\longrightarrow$	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pumps, filters, etc.), all painting (e.g., pumps, pipes, etc.), all lubrications (e.g., process pumps, valves, etc.), all inspections (e.g., packing, etc.), all monitoring (e.g., bearings, valves, etc.), all mechanical adjustments (e.g., couplings, etc.).

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: open channels, walks (e.g., grease, oil, ice, etc.), moving parts (e.g., belts, couplings, etc.), high pressure.
2. Use of these items of safety equipment: rails, chains, life preservers, ropes, harnesses, protective clothing (e.g., safety shoes, gloves, hard hat, etc.), lock out tags and keys.

PREVENTIVE MAINTENANCE skill and knowledge for FLOW MEASUREMENT CMP UNIT...

R-10. *Centralized recording and totalizing system including Parshall flume, venturi meter, magnetic flow meter, and rotameter*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate these aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT R-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., stilling wells, pens, etc.), all painting (e.g., piping, etc.), all lubrications (e.g. Parshall flumes, etc.), all monitoring (e.g., Parshall flumes, venturi meter, etc.), all mechanical adjustments (e.g., float switch, etc.).

RESPONSE DETAIL: For specific CMP UNIT R-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: poorly ventilated or open pits, electrial shock.

PREVENTIVE MAINTENANCE skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. *System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., pump, diesel engine, etc.), all painting (e.g., pump, motor, etc.), all lubrications (e.g., bearings, seals, etc.), all monitoring (e.g., pumps, speed reducers, etc.), all inspections (e.g., wear rings, shaft play, etc.), all mechanical adjustments (e.g., shaft play, belt tension, etc.).

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: loose clothing, slippery walks (e.g., grease, oil, ice, etc.), rotating and reciprocating parts; handling contaminated equipment, hot manifolds, engine noise; hot pipe (e.g., steam, engine lube oil, engine cooling water, engine exhaust, etc), hoist equipment under tension (pressurized or spring loaded).
2. Use of these items of safety equipment: protective clothing (e.g., safety shoes, hard hats, gloves, etc.), flashlights, first aid kit, fire fighting equipment, ear protection, explosion proof flashlight safety solvent, grounded tools and extension cords, lockouts and tags, eye protection.

PREVENTIVE MAINTENANCE skill and knowledge for ELECTRIC POWER CMP UNIT . . .

T-10. *System using delta transformers, generator, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S →	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., generator, exciter, etc.), all painting (e.g., generator, transformer cases, etc.), all lubrications (e.g., generator, diesel engine, etc.), all monitoring (e.g., breakers, controls, etc.), all inspections (e.g., generator, exciter, etc.), all mechanical adjustments (e.g., generator, diesel, etc.).

RESPONSE DETAIL: For specific CMP UNIT T-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: electrical shock, thermal burns, noise, rotating equipment, flammable solvents, explosive atmosphere.
2. Attention to these high risk activities: activating or deactivating circuits.
3. Use of these items of safety equipment: pad locks, ear muffs or ear protector, rubber mats under all switch gear panels, explosion proof flashlight, protective clothing (e.g., rubber boots, safety shoes, rubber electrical gloves, insulated jacket, hard hat, etc.), first aid kit, fire fighting equipment, load break ratings on switchgear, shorting sticks.

PREVENTIVE MAINTENANCE skill and knowledge for GAS POWER CMP UNIT . . .

U-10. *System with internally produced gas with high pressure tanks and rotary positive displacement compressors*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 302:

S ⟶	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: all cleaning (e.g., drip traps, moisture accumulator, etc.), all painting (e.g., valves, piping, etc.), all lubrications (e.g., valves, meters, etc.), all monitoring (e.g., valves, meters, etc.), all inspections (e.g., drip traps, valves, etc.), all mechanical adjustments (e.g., pressure switches, meters, etc.).

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: gas leakage, excessive high pressure, negative pressure, rotating equipment, abrasions to hands while turning valve handles or using valve chains, explosive mixtures, improper disposal of spent gas scrubber contents, iron sulfide in exposed gas lines and units, hoisting, solvents and wiping or cleaning rags used in painting, belts, couplings.
2. Use of these items of safety equipment: explosion proof equipment, non-sparking tools, explosion meter, hydrogen sulfide amp tools, continuous operation gas monitor, first aid kit, fire fighting equipment, protective clothing (e.g., rubber gloves and boots, hard hat, etc.), salt tablets.

SPECIFIC BEHAVIOR for . . .

CORRECTIVE MAINTENANCE

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GENERAL CRITERION BEHAVIOR

401

CORRECTIVE MAINTENANCE skill and knowledge for COLLECTION CMP UNIT . . .

A-10. Combined system with industrial waste

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S ⟶	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: flooded manholes; broken pipes; separated joints; broken, separated, or leaking manholes; cave-ins; wet soil (near pressure mains); missing manhole covers; inoperative regulators, weirs, or flap gates.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, sewer system map and specifications, inspection records.

Continued on following page

Continued from previous page, Specific Behavior 401-A

2. Consideration of these reasons or causes: poor design, construction, inspection, or preventive maintenance; soil subsidence; change in water table.

CORRECTIVE MAINTENANCE skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. *Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S ⟶	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: vent fan, alarm system, injector, evaporator, pressure or vacuum gages, rate controller or rotameter inoperative; damaged cylinder; damaged valves; kinked pig tail; loose connections; bent or misaligned charts; pen not printing; compressor hot; motor hot or inoperative; air storage tank empty; rupture disc ruptured; atypical sound.

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 401-B

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: loss of control system, low water in evaporator, excessive corrosion, loss of injector water, loss of chlorine pressure.

CORRECTIVE MAINTENANCE skill and knowledge for SCREENING AND GRINDING CMP UNIT . . .

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: rake not moving, motor turning; rake not moving, motor not turning; grinder not grinding, motor turning; grinder not grinding, motor not turning; broken chain (inc. link, link pin, cotter pin); broken sprocket, rake, rake cleaner, screen belt, rake drive, belt drive, shaft; worn out bearings, link pin out, pin sheared; inoperative motor, bubbler control, water valve.
2. These terms or descriptions (not already implied): clearance between rake and bars.

Continued on following page

Continued from previous page, Specific Behavior 401-C

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: jammed by debris, misalignment, broken component, chain tension.

CORRECTIVE MAINTENANCE skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfuntions or these indications thereof: atypical sound, higher than normal temperature, vapors, vibration, pilot lights off, inoperative unit, unlubricated bearings, overloaded prime movers, electrical motor inoperative, electrical control equipment inoperative, grease or oil on motor windings, insulation burned off electrical wiring, overloaded process, absence of agitation.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 401-D

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: improper ventilation, equipment not adequately shielded from moisture.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

401 - E

CORRECTIVE MAINTENANCE skill and knowledge for PRIMARY SEDIMENTATION UNIT . . .

E-10. *Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: misalignment of flights; chains off sprockets; broken shafts, sprockets, flights, and chain (inc. pins, links); worn flights and shoes; stuck or leaking telescopic valve; motor running/pump not moving; pump turning backwards; inoperative density meter or time clock.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: excessive wear due to abnormal grit and/or excessive solids, foreign objects in the tank (e.g., hoses, tools, etc.), inoperative overload protective devices.

CORRECTIVE MAINTENANCE skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. Rotary distributor, standard rate unit with dosing tank

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: forced air system inoperative, rotary distributor turning too slowly, rotary distributor not turning/sewage flowing, rotary distributor not turning/sewage not flowing, bad bearing, mercury seal gone, dosing tank inoperative.

RESPONSE DETAIL: For specific CMP UNIT F-10, ther general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

Continued on following page

Continued from previous page, Specific Behavior 401-F

2. Consideration of these reasons or causes: defective bearings (e.g., frozen, etc.), excessive debris (e.g., rags, solids, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: meter readings (high, low), atypical sound, roll of liquid, frothing, DO (high, low), meters, blowers, motors, pumps, surging.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: loss of power, broken piping, faulty valve.

CORRECTIVE MAINTENANCE skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: misalignment of flights; chains off sprockets; broken shafts, sprockets, flights, and chain (inc. pins, links); worn flights and shoes; stuck or leaking telescopic valve; motor running/pump not moving; pump turning backwards; inoperative density meter or time clock; suction arms not turning; pump not pumping; meter reading (high, low).

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 401-H

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: excessive wear due to abnormal grit and/or excessive solids, foreign objects in the tank (e.g., hoses, tools, etc.), inoperative overload protective devices.

CORRECTIVE MAINTENANCE skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these indications thereof: washouts, short circuiting, low DO, weeds, pump failure, flooding, motor failure.

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: insufficient depth, poor ground cover.

CORRECTIVE MAINTENANCE skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: worn bearings, hot bearings, hot motor windings, inaccurate gages, pressure imbalance, high solids in overflow, worn chain, sprockets off track, excess flow from stuffing box, vibration, noise, odor, pressure loss, liquid level variations, low pump discharge, high discharge head, inoperative motor, pump, screw, skimmer or compressor.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 401-J

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: heat exchanger not lighting; recirculation pump inoperative; sludge pump, heat exchanger water pump, and gas compressor inoperative.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. *Floating cover unit with gas storage*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: gas pressure (high, low), inoperative pump, cover stuck, water in gas lines, pressure valve on waste gas burner stuck, vacuum-pressure relief valve inoperative.

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturer's maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

401 - M

CORRECTIVE MAINTENANCE skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: worn bearings; hot bearings; pressure losses; meter readings (high, low); sound; floating solids; stopping and starting of unit; alarms; chemical strength; vibrations; lack of lubrication; pumps inoperative; pumps running too fast or too slow; collector inoperative; liquid level (high, low); short shelf life; wrong mixture of chemicals; shear pin broken; inoperative motor, collector mechanism, or flights; broken sprockets or chains; inoperative gear box or rotameter; faulty control loops.

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 401-M

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: vent fan, alarm system, injector, evaporator, pressure or vacuum gages, rate controller, or rotameter inoperative; damaged cylinder; damaged valves; kinked pig tails; loose connections; bent or misaligned charts; pen not printing, compressor hot; motor hot or inoperative; air storage tank empty; rupture disc ruptured, atypical sound, clogged filters, tubes, sample pump not running.

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 401-N

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These malfunctions or these indications thereof: drum inoperative, no vacuum, no pressure, sludge pump inoperative, media torn, motor inoperative.

--For specific CMP UNIT 0-11--

1. These malfunctions or these indications thereof: sludge pump or centrifuge inoperative, motor inoperative.

Continued on following page

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RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

--For specific CMP UNIT 0-11--

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: rake, fan, conveyor, or ash pump inoperative.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: bearing atypical noise, loss of pressure or flow, pump drive or coupling failure, loss of power, impeller inoperative, bearing failure, ruptured piping, filter clogging, packing failure.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for FLOW MEASUREMENT CMP UNIT...

R-10. *Centralized recording and totalizing system including Parshall flume, venturi meter, magnetic flow meter, and rotameter*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT R-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: incorrect flow measurement, obstructions in primary measuring elements.

RESPONSE DETAIL: For specific CMP UNIT R-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

Continued on following page

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2. Consideration of these reasons or causes: wear of components, loss of transmission signal.

CORRECTIVE MAINTENANCE skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: worn pump components--impellers (radial, mixed flow, axial); casings (volute, diffuser, split); packing (seal, mechanical); bearing (e.g., radial, thrust, etc.); shaft (inc. sleeve); couplings; wear rings; piston; air chamber; eccentric; diaphragm; rotor; stator; worn diesel unit components (inc. air starter, fuel injector, lube oil system, cooling water system, thermocouples, control panel); worn magnetic clutch unit components (inc. bearing guide rectifier, load cell, cooling loop, air compressor, rheostat); bubbler system components malfunctioning (inc. differential-pressure cell, air compressor, pressure switches, flow regulator); worn electric motor components (inc. stator and rotor windings, bearings seals); worn speed reducer (inc. gear, actuator, belt); valves inoperative (e.g.,

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gate, check, globe, plug, butterfly, cone, ball, regulating, etc.); clogged, worn or inappropriate pipe fittings (e.g., T's, ells, Caps, Y's, Flanges, eccentric and concentric reducers, etc.); reduced or no output, noise; excessive pressure; loss of pressure; heat build up in piping; clogging; cavitation; lubrication failure; cooling failure; breakage of belts, valve control line, pipeline or valves.

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

CORRECTIVE MAINTENANCE skill and knowledge for ELECTRIC POWER CMP UNIT . . .

T-10. *System using delta transformers, generator, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S ⟶	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: stoppage of equipment, slow-down of equipment, dimming of lights, sparking, failure of equipment to shut off at specified setting.

RESPONSE DETAIL: For specific CMP UNIT T-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.

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2. Consideration of these reasons or causes: dirt, moisture, gases.

CORRECTIVE MAINTENANCE skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 401:

S →	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These malfunctions or these indications thereof: leaking or inoperative valve, drip trap; inoperative or inaccurate meter; pressure reducing valve; pressure relief valve, manometer, pressure gages; inoperative flame arrestors or gas booster and motor, excessively high or low pressure, excessive H_2S content, motor control failure to start or stop unit at specified operating levels, inoperative rotary positive displacement compressor and motor, leaking gas sphere.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 401-U

1. Use of these reference tools: plant developed corrective maintenance guides, manufacturers' maintenance guides, parts catalogs, plant drawings and specifications, inspection records.
2. Consideration of these reasons or causes: corrosion.

CORRECTIVE MAINTENANCE SPECIFIC BEHAVIOR for . . .

GENERAL CRITERION BEHAVIOR

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SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
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CORRECTIVE MAINTENANCE skill and knowledge for COLLECTION CMP UNIT . . .

A-10. Combined system with industrial waste

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: sewers (e.g., interceptor, collector, lateral, branch, main, pressure, etc.), house connection, sewer tap, pipe joints (e.g., O-ring, compression, bituminous, hydraulic, mortar, epoxy mortar, etc.), manholes, tap line for new connections, inverted siphon, dosing tank, manhole covers (unsealed and sealed), regulators, weirs (e.g., side overflow, leaping), flap gates, catch basins.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance manuals, design and operation manuals (e.g., WPCF Manuals #7 and #9, etc.). design drawings (e.g., hydraulic profiles, construction detail, etc.), "as built" plans, handbooks (e.g., hydraulic, civil, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component or the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: regulators (chlorine pressure, injector vacuum, water pressure), cut chart, gas rate controller, rotameter float, cylinders, vent fan, pig tails (inc. caps), valves (e.g., header, pressure relief, pressure reducing, cylinder, etc.), hoist, chart drive, recording chart, pen, compressor, drive belt, motor, air storage tank, scales, pneumatic control device, alarm system (e.g., leak detection device, chlorine pressure, evaporator, water level, etc.), evaporator, rupture disc.

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual # 11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for SCREENING AND GRINDING CMP UNIT . . .

C-10. Mechanically cleaned bubbler control unit with grinder

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: chain (inc. attachment links, link pins, cotter pins, shear pins, slackness), sprockets, rakes (inc. angle, attachment bolts), rake cleaner (inc. shock absorber, connector), screen belt (inc. adjustment mechanism, scraper, rollers), rake drive (inc. motor, gear box, drive chain, sprockets), belt drive (inc. motor, gear box, drive belts, pulleys), bar screen enclosure (inc. doors, covers), shaft, grinder (inc. motor, drive belt, pulleys, atypical sound), bubbler control, effective surface of bar rack, flush water device, amperes drawn, alarm, bar rack, flashing valve, electrical overload device, fire fighting equipment, speed reducers.

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

CORRECTIVE MAINTENANCE skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: blower, motor and mounting, speed reducer, manifold, piping weir, air pressure relief, silencer, air cleaner, electrical control equipment, couplings, pressure indicating device, baffles, diffusers, tank, gear box, receiving hopper, chains (inc. shear pins, special links, cotter pins, link pins, etc.), buckets, shoes, guide rails, sprockets, shafts, shaft bearings (grease lubricated and water lubricated), belts, tighteners, blower and bucket drive speed controls, valves (control, check), fire fighting equipment, first aid kit.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

CORRECTIVE MAINTENANCE skill and knowledge for PRIMARY SEDIMENTATION UNIT . . .

E-10. *Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: flights, drive motor, gear box, sprockets, chain, clutch, shear pin, skimmer trough, grease pit, sludge wells, telescopic valve (inc. wheel, stem, indicator), time clock, density meter, weirs, piping, valves (inc. gate, plug, ball, check), pumps, motors, water seal units, belts, pulleys, limit switch, variable speed drive, rails, shoes, sluice gates, baffles, first aid kit, fire fighting equipment.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
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402 - F

CORRECTIVE MAINTENANCE skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. Rotary distributor, standard rate unit with dosing tank

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: dosing tank (inc. piping, bell, structure), rotary distributor (inc. ports, rotation speed), media (inc. biological growth), structure (inc. underdrains if visible), blow off pipe, siphon breaker, motors, belts, fan, vents, first aid kit, fire fighting equipment.

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.
2. Consideration of these points: uniform dosing of filter bed, siphoning action, intermittent flow.

CORRECTIVE MAINTENANCE skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: motors, blowers, manometers, pumps, indicator lights, diffuser tubes, header, valves, indicator gages, meters (e.g., primary effluent, return sludge, air, etc.), foam spray system, fire fighting equipment, first aid kit.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general stimulus (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.).
2. Consideration of these points: sufficient air to maintain DO, continuous return sludge, intermittent wasting sludge, optimum solids loadings, BOD loadings and efficiency of removal.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA
402 - H

CORRECTIVE MAINTENANCE skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: flights, drive motor, gear box, sprockets, chain, clutch, shear pin, grease pit, sludge wells, telescopic valve (inc. wheel, stem, indicator), time clock, density meter, weirs, piping, valves (inc. gate, plug, ball, check), pumps, motors, water seal units, belts, pulleys, limit switch, variable speed drive, rails, shoes, sluice gates, baffles, first aid kit, fire fighting equipment, suction arms, suction arm drive, suction arm protection device.

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

402 - I

CORRECTIVE MAINTENANCE skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: comminutor, pumps, motors, valves, diversion box, lines (influent, effluent), chemical conditioning units, first aid equipment, fire fighting equipment.

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" pland, handbooks, (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

CORRECTIVE MAINTENANCE skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: skimmer, chain, sprocket, flights, track, drive motor, gear reducer and drive chain, screw drive motor, overflow weir adjustments, pressure tanks, pressure tank regulator valve, sight glass, air compressor, pulley, drive belts, control board (inc. air pressure gages), butterfly valve position, pumps, gear box, first aid kit, fire fighting equipment.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: recirculation pump, heat exchanger, gas recirculation system, sludge pump, supernatant overflow, meters, relief valves, water traps.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.).
2. Consideration of these points: sludge mixing, proper temperature.

CORRECTIVE MAINTENANCE skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. Floating cover unit with gas storage

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: pump, motor, variable speed drive, drive belt, manometer, floating cover, vacuum-pressure relief valve.

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g. WPCF manuals #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.
2. Consideration of these points: continuous supernatant withdrawal, protection of structure.

CORRECTIVE MAINTENANCE skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: elutriation [e.g., tanks, pumps, flights, collector, chains (e.g., links, link pins, shear pins, etc.), sprockets, shafts, motor, speed reducer, couplings, rails, shoes, valves, flow meters, bucket elevator, overload alarms, etc.]; chemical conditioning tank [e.g., agitator drive, chemical feed pumps (speed reducers and controls), chemical dry tanks, chemical feeders, slakers (e.g., paste, liquid, etc.); elutriation and chemical conditioning tank [fire fighting equipment, first aid kit, control loops (e.g., pH, etc.)].

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.
2. Consideration of these points: sludge coagulation, lowering alkalinity, preparing sludge for filtration, cake production, dewatering costs, dewatering efficiency.

CORRECTIVE MAINTENANCE skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. *Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: regulators (chlorine pressure, injector vacuum, water pressure), cut chart, gas rate controller, rotameter float, cylinders, vent fan, pig tails (inc. caps), valves (e.g., header, pressure relief, pressure reducing, cylinder, etc.), hoist, chart drive, recording chart, pen, compressor, drive belt, motor, air storage tank, scales, pneumatic control device, alarm system (e.g., leak detection device, chlorine pressure, evaporator water level, etc.), first aid kit, fire fighting equipment, evaporator, rupture disc, analyzer, tubes, filters, buffer solution, sample pump and motor.

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These components: blower; vacuum, filtrate and sludge pumps (inc. motor, pulley, belt); vacuum gage; agitator (inc. motor, variable speed drive); conveyor belt; rollers; scrapers; chemical conditioning apparatus; solids content; rotameters; mixing tank (inc. stirrer); oil valve; first aid kit; fire fighting equipment.

--For specific CMP UNIT 0-11--

1. These components: sludge pump, motor (inc. bearings, pressure, vibration), pressure gage, variable speed drive (inc. belt, pulley), centrifuge (inc. motor, drive belt, vibration, amperage gage, noise), first aid kit, fire fighting equipment.

RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

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Continued from previous page, Specific Behavior 402-0

--For specific CMP UNIT 0-10--

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.
2. Consideration of these points: progression of sludge through system, separation.

--For specific CMP UNIT 0-11--

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.
2. Consideration of these points: progression of sludge through system, separation.

CORRECTIVE MAINTENANCE skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S ⟶	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: rake drive motor, fan and motor, conveyor belt, ash hopper, ash pump, wash water, gears, drive belt, rake, first aid kit, hearth.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.
2. Consideration of these points: drying of dewatered sludge, movement of sludge toward bottom, burning of sludge.

CORRECTIVE MAINTENANCE skill and knowledge for EFFLUENT CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: pumps, pipes, channels, bearings, valves, couplings, filters, first aid kit, fire fighting equipment.
2. These terms or descriptions (not already implied): process water system.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.
2. Consideration of these points: pressures, flow rates, use of recycle water.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

402 - R

CORRECTIVE MAINTENANCE skill and knowledge for FLOW MEASUREMENT CMP UNIT...

R-10. *Centralized recording and totalizing system including Parshall flume, venturi meter, magnetic flow meter, and rotameter*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S ⟶	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT R-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: Parshall flume(inc. stilling well, float, float switch, flow indicator, transmitter), venturi meter (inc. flushing pump, sight glass, plunger, flow indicator transmitter), magnetic flow meter (inc. flow indicator, flow recorder, transmitter), rotameter (inc. flow indicator, flow recorder, transmitter), receivers, totalizers, pens, charts, flow indicator.

RESPONSE DETAIL: For specific CMP UNIT R-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

402 - S

CORRECTIVE MAINTENANCE skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

> S-10. *System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: pump, couplings, speed controllers, control systems and activators, motors, diesels, valves, piping, fittings, gages (e.g., vacuum, pressure, etc.), switches (e.g., variable speed, start, stop, etc.), seals, valves, belts; speed reducer (inc. gear, actuator, belt), valves (e.g., gate, check, globe, plug, butterfly, cone, ball, regulating, etc.), pipe fittings (e.g., T's, ells, Caps, Y's, Flanges, eccentric and concentric reducers, etc.).

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

CORRECTIVE MAINTENANCE skill and knowledge for ELECTRIC POWER CMP UNIT . . .

T-10. *System using delta transformers, generator, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S ⟶	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: generator, exciter, diesel, power generation control center, primary feeder breaker (manually or electrically activated), primary feeder transformer, transformer breaker, load bus, feeder breaker, load distribution panel or center, motor control center, magnetic starters (inc. contactor, coil, push buttons, selector switches, indicator lights, overload circuits), automatic control actuators (inc. floats, pressure switches, thermastats, microswitches, timers), disconnect switches, ampmeters, voltmeters, watt-hour meters, elasped time meters, frequency meters, power factor meter, overvoltage relays, undervoltage relays, lighting transformers, emergency lighting system.

RESPONSE DETAIL: For specific CMP UNIT T-10, the general response (R) above implies appropriate representation of at least the following . . .

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1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 402:

S →	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components: gas holder cover, meters, drip traps, moisture accumulator, valves (e.g., plug, pressure reducing, pressure relief, etc.), manometer, pressure gages, flame arrestors, primary gas receiver, gas booster (blower and motor, coupling, controls), secondary gas receiver, high and low pressure switches, gas filters, gas scrubbers, vacuum relief valves, waste gas burner explosion proof switch gear, gas storage sphere, blower.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' maintenance guides, operation manuals (e.g., WPCF manual #11, etc.), "as built" plans, handbooks (e.g., electrical, mechanical, chemical, civil, etc.), shop drawings.

CORRECTIVE MAINTENANCE SPECIFIC BEHAVIOR for . . .

GENERAL CRITERION BEHAVIOR

403

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

403 - A

CORRECTIVE MAINTENANCE skill and knowledge for COLLECTION CMP UNIT . . .

A-10. *Combined system with industrial waste*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S ⟶	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT A-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to the malfunctions in flooded manholes; broken pipes; separated joints; broken, separated, or leaking manholes; cave-ins; wet soil (near pressure mains); missing manhole covers; inoperative regulators, weirs, or flap gates.

RESPONSE DETAIL: For specific CMP UNIT A-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: oxygen deficiency, toxic gases, traffic, open channels or pits, manhole covers, ladders, infection, flooding, cave-ins, rotating and reciprocating equipment, heavy construction equipment, explosive solvents.
2. Attention to these high risk activities: working alone in manholes, entering or leaving manholes, working in excavations, cave-ins.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes or boots, gloves, hard hat, etc.), explocimeter, oxygen deficiency meter, ropes, harness, self-contained breathing apparatus, exhaust fans, blowers, explosion proof lights, traffic barriers, cones, flashing lights, shoring, dewatering equipment.

CORRECTIVE MAINTENANCE skill and knowledge for PRECHLORINATION CMP UNIT . . .

B-10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S ⟶	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT B-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in vent fan, alarm system, injector, evaporator, pressure or vacuum gages, rate controller or rotameter inoperative; damaged cylinder; damaged valves; kinked pig tail; loose connections; bent or misaligned charts; pen not printing; compressor hot; motor hot or inoperative; air storge tank empty; rupture disc ruptured; atypical sound.

RESPONSE DETAIL: For specific CMP UNIT B-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphragms, pig tails, and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug; electrical equipment; chlorine in piping and equipment; opening piping and equipment.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails, handling chemically covered components.
3. Use of these items of safety equipment: canister gas mask, self-contained air mask, chlorine cylinder leak repair kits for various size cylinders.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

403 - C

CORRECTIVE MAINTENANCE skill and knowledge for SCREENING AND GRINDING CMP UNIT . . .

C-10. *Mechanically cleaned bubbler control unit with grinder*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT C-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in rake not moving, motor turning; rake not moving, motor not turning; grinder not grinding, motor turning; grinder not grinding, motor not turning; broken chain (inc. link, link pin, cotter pin); broken sprocket, rake, rake cleaner, screen belt, rake drive, belt drive, shaft; worn out bearings, link pin out, pin sheared; inoperative motor, bubbler control, water valve.

RESPONSE DETAIL: For specific CMP UNIT C-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, rakes belts, shafts, couplings, grinder teeth, sprockets, etc.), slippery walks (e.g., grease, oil, ice, etc.), open doors or covers, electrical equipment, explosive fumes, welding torch.
2. Attention to these high risk activities: Making adjustments with switch in automatic position, entering deep wells.
3. Use of these items of safety equipment: protective clothing (e.g., rubber gloves, safety shoes or boots, hard hat, etc.), railings, stair safety treads, first aid kit, electrical lockout tags and keys.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA
403 - D

CORRECTIVE MAINTENANCE skill and knowledge for GRIT REMOVAL CMP UNIT . . .

D-10. Aerated unit with bucket elevator

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S $\longrightarrow$	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT D-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunction in atypical sound, higher than normal temperature, vapors, vibration, pilot lights off, inoperative unit, unlubricated bearing, overloaded prime movers, electrical motor inoperative, electrical control equipment inoperative, grease or oil on motor windings, insulation burned off of electrical wiring, overloaded process, absence of agitation.

RESPONSE DETAIL: For specific CMP UNIT D-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., buckets, chains, couplings, etc.), slippery walks (e.g. grease, oil, ice, etc.), open tanks, smooth treads, wet treads, electrical equipment, belts.
2. Attention to these high risk activities: working near or on moving parts, working in unventilated area, hand removal of grease.
3. Use of these items of safety equipment: life preserver, protective clothing (e.g., safety shoes, gloves, hard hat, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for PRIMARY SEDIMENTATION CMP UNIT . . .

E-10. *Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S ⟶	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT E-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to the malfunction of misaligned flights; sprockets with chains off; broken shafts, broken flights, broken chain (inc. pins, links); worn flights and shoes; stuck or leaking telescopic valve; motor running/pump not moving; pump turning backwards; inoperative density meter or time clock.

RESPONSE DETAIL: For specific CMP UNIT E-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, belts, shafts, couplings, etc.), slippery walks and stairs (e.g., grease, oil, ice, etc.), pits, electrical equipment, ladders, radiation, falling objects.
2. Attention to these high risk activities: working in or near open pits.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preservers, explosion proof flashlight, hand rails, dosimeter, barricades.

CORRECTIVE MAINTENANCE skill and knowledge for TRICKLING FILTRATION CMP UNIT . . .

F-10. *Rotary distributor, standard rate unit with dosing tank*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S	→ R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT F-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunction in forced air system inoperative, rotary distributor not turning/sewage not flowing, bad bearing, mercury seal gone, dosing tank inoperative.

RESPONSE DETAIL: For specific CMP UNIT F-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: slippery walks (e.g., grease, oil, ice, etc.), moving parts (e.g., pulleys, belts, fan, etc.), paint fumes, mercury.
2. Use of these items of safety equipment: safety treads on stairs and ladders, protective clothing (e.g., safety shoes, gloves, hard hat, boots, etc.).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

403 - G

CORRECTIVE MAINTENANCE skill and knowledge for AERATION CMP UNIT . . .

G-10. Diffused air unit with swing type diffuser producing fine bubbles

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT G-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting malfunctions in meter readings (high, low), atypical sound, roll of liquid, frothing, DO (high, low), meters, blowers, motors, pumps, surging.

RESPONSE DETAIL: For specific CMP UNIT G-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: wells, loose railings, electrical equipment, gratings, slippery walks (e.g., grease, oil, ice, etc.), rotating equipment.
2. Attention to these high risk activities: working near unrailed pits or wells.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preserver.

CORRECTIVE MAINTENANCE skill and knowledge for SECONDARY SEDIMENTATION CMP UNIT . . .

H-10. Circular, peripheral feed unit with suction

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT H-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions of misalignment of flights; chains off sprockets; broken shafts, sprockets, flights, and chain (inc. pins, links); worn flights and shoes; stuck or leaking telescopic valve; motor running/pump not moving; pump turning backwards; inoperative density meter or time clock; suction arms not turning; pump not pumping; meter reading (high, low).

RESPONSE DETAIL: For specific CMP UNIT H-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., chains, belts, shafts, couplings, etc.), slippery walks and stairs (e.g., grease, oil, ice, etc.), pits, electrical equipment.
2. Attention to these high risk activities: working in or near open pits.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), life preservers, explosion proof flashlight, hand rails.

CORRECTIVE MAINTENANCE skill and knowledge for POND STABILIZATION CMP UNIT . . .

I-10. Aerobic pond

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT I-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions of rake not moving, motor turning; rake not moving, motor not turning; grinder not grinding, motor turning; grinder not grinding, motor not turning; broken chain (inc. link, link pin, cotter pin); broken sprocket, rake, rake cleaner, screen belt, rake drive, belt drive, shaft; worn out bearings, link pin out, pin sheared; inoperative motor, bubbler control, water valve.

RESPONSE DETAIL: For specific CMP UNIT I-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: ground undermined, wet or damp grass or rocks, electrical wires in damp areas, poisons for control of plants and animals, stepping in chuck holes, contamination by contact, boat and motor, rodents, herbicides and soil sterilizers, chuck holes, holes in fence, electrical shock, slippery dikes, nongrounded control panel.
2. Attention to these high risk activities: removal of vegetation by hoe adjacent to electrical wire, reaching over pond to remove debris.
3. Use of these items of safety equipment: fence, adequate lighting, signs, locks, electrical wire enclosed, fire fighting equipment, protective clothing (e.g., gloves, boots, etc.), adequate fencing and signs, safety of equipment in boat.

CORRECTIVE MAINTENANCE skill and knowledge for THICKENING CMP UNIT . . .

J-10. Floatation unit with air

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT J-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in worn bearings, hot bearings, hot motor windings, inaccurate gages, pressure imbalance, high solids in overflow, worn chain, sprockets off track, excess flow from stuffing box, vibration, noise, odor, pressure loss, liquid level variations, low pump discharge, high discharge head, inoperative motor, pump, screw, skimmer or compressor.

RESPONSE DETAIL: For specific CMP UNIT J-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: steps, pits, slippery floors and walks (e.g., grease, oil, ice, etc.), loose hand rails, moving parts (e.g., sprockets, chains, drive gears, belts, pulleys, etc.), electrical equipment, high water pressure equipment, gratings, high air pressure equipment and piping, wells, pits, tanks.
2. Attention to these high risk activities: operation of skimmers, screw, moving shafts, working in or near pits, lifting heavy objects.
3. Use of these items of safety equipment: protective clothing (e.g., rubber boots, gloves, hard hat, etc.), explosion proof electrical equipment.

CORRECTIVE MAINTENANCE skill and knowledge for FIRST STAGE DIGESTION CMP UNIT . . .

K-10. Fixed cover, gas recirculation unit with external heat exchanger

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT K-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in heat exchanger not lighting; recirculation pump inoperative sludge pump, heat exchanger water pump, and gas compessor inoperative.

RESPONSE DETAIL: For specific CMP UNIT K-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), slippery walks or stairs (e.g., grease, oil, ice, etc.), fire, explosion, lifting heavy
2. Attention to these high risk activities: all activities around possible sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), vents, gas flame traps, pressure relief valves, no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, fire fighting equipment.

CORRECTIVE MAINTENANCE skill and knowledge for SECOND STAGE DIGESTION CMP UNIT . . .

L-10. Floating cover unit with gas storage

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S ⟶	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT L-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in gas pressure (high, low), inoperative pump, cover stuck, water in gas lines, pressure valve on waste gas burner stuck, vacuum-pressure relief valve inoperative.

RESPONSE DETAIL: For specific CMP UNIT L-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., shafts, couplings, belts, pulleys, etc.), fire, explosion, slippery walks (e.g., grease, oil, ice, etc.).
2. Attention to these high risk activities: all activities around sources of gas leakage.
3. Use of these items of safety equipment: protective clothing (e.g., safety shoes, gloves, hard hat, etc.), no smoking signs, hand rails, safety treads on ladders and stairs, first aid kit, explosion proof electrical fixtures, flame trap, fire fighting equipment.

CORRECTIVE MAINTENANCE skill and knowledge for SLUDGE CONDITIONING CMP UNIT . . .

M-10. Chemical conditioning unit with counter-current elutriation

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT M-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in rake not moving, motor turning; rake not moving, motor not turning; grinder not grinding, motor turning; grinder not grinding, motor not turning; broken chain (inc. link, link pin, cotter pin); broken sprocket, rake, rake cleaner, screen belt, rake drive, belt drive, shaft; worn out bearings, link pin out, pin sheared; inoperative motor, bubbler control, water valve.

RESPONSE DETAIL: For specific CMP UNIT M-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: acidic and alkaline solutions, spraying or splattering sludge and chemicals; rotating or oscillating equipment, slippery floors and catwalks (e.g., grease, oil, ice, etc.), chemical irritation.
2. Attention to these high risk activities: mixing chemicals, pressurizing chemical storage containers, walking in or near pits, lifting heavy objects, handling chemically coated equipment and components.
3. Use of these items of safety equipment: face shields, protective clothing (e.g., safety shoes, hard hat, gloves, aprons, rubber boots), solutions, eye wash stations, protective breathing apparatus.

CORRECTIVE MAINTENANCE skill and knowledge for POSTCHLORINATION CMP UNIT . . .

N-10. *Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S ⟶	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT N-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in vent fan, alarm system, injector, evaporator, pressure or vacuum gages, rate controller, or rotameter inoperative; damaged cylinder; damaged valves; kinked pig tails; loose connections; bent or misaligned charts; pen not printing; compressor hot; motor hot or inoperative; air storage tank empty; rupture disc ruptured, atypical sound, clogged filters, tubes, sample pump not running.

RESPONSE DETAIL: For specific CMP UNIT N-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: hoist in operation; cylinder lifting bar; slippery walks or stairs (e.g., oil, grease, ice, etc.); leaking cylinders, valves, diaphragms, pig tails, and rupture disc; defective alarm system; liquid chlorine in chlorinator; fusible plug; electrical equipment; chlorine in piping and equipment; opening piping and equipment.
2. Attention to these high risk activities: changing cylinders, replacing valves and pig tails, handling chemically covered components.
3. Use of these items of safety equipment: canister gas mask, self-contained air mask, chlorine cylinder leak repair kits for various size cylinders.

CORRECTIVE MAINTENANCE skill and knowledge for SLUDGE DEWATERING CMP UNITS . . .

0-10. Vacuum filter unit with cloth

0-11. Continuous feed centrifuge unit

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: The general stimulus (S) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. These specific procedures: correcting condition with respect to malfunctions in inoperative drum, no vacuum, no pressure, inoperative sludge pump, torn media, inoperative motor.

--For specific CMP UNIT 0-11--

1. These specific procedures: correcting condition with respect to malfunctions in inoperative sludge pump or centrifuge, inoperative motor.

RESPONSE DETAIL: The general response (R) above implies appropriate representation of at least the following . . .

--For specific CMP UNIT 0-10--

1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice, etc.).
2. Use of these items of safety equipment: proper lighting, belt guards, railings, first aid kit, proper ventilation, fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, gloves, etc.).

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--For specific CMP UNIT 0-11--

1. Attention to these sources of danger: moving parts (inc. belts, pulleys, shafts, couplings), electrical shock, explosive gases, walks (e.g., grease, oil, ice, etc.).
2. Use of these items of safety equipment: proper lighting, belt guards, railings, first aid kit, proper ventilation, fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, gloves, etc.).

CORRECTIVE MAINTENANCE skill and knowledge for SOLIDS DISPOSAL CMP UNIT . . .

P-10. Multiple hearth incinerator unit

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S	→ R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT P-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions such as rake not moving, motor turning; rake not moving, motor not turning; grinder not grinding, motor turning; grinder not grinding, motor not turning; broken chain (inc. link, link pin, cotter pin); broken sprocket, rake, rake cleaner, screen belt, rake drive, belt drive, shaft; worn out bearings, link pin out, pin sheared; inoperative motor, bubbler control, water valve.

RESPONSE DETAIL: For specific CMP UNIT P-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: moving parts (e.g., belts, gears, shafts, pulleys, etc.), heated parts, flammable paint.
2. Attention to these high risk activities: handling hot materials.
3. Use of these items of safety equipment: fire fighting equipment, protective clothing (e.g., safety shoes, hard hat, asbestos gloves, etc.).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

403 - Q

CORRECTIVE MAINTENANCE skill and knowledge for EFFLUENT DISPOSAL CMP UNIT . . .

Q-10. Direct reuse system

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S	→ R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT Q-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions such as bearing atypical noise, loss of pressure or flow, pump drive or coupling failure, loss of power, impeller inoperative, bearing failure, ruptured piping, filter clogging, packing failure.

RESPONSE DETAIL: For specific CMP UNIT Q-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: open channels, walks (e.g., grease, oil, ice, etc.), moving parts (e.g., belts, couplings, etc.).
2. Use of these items of safety equipment: rails, chains, life preservers, ropes, harnesses, protective clothing (e.g., safety shoes, gloves, hard hat, etc.), lock out tags and keys.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

403 - R

CORRECTIVE MAINTENANCE skill and knowledge for FLOW MEASUREMENT CMP UNIT...

R-10. *Centralized recording and totalizing system including Parshall flume, venturi meter, magnetic flow meter, and rotameter*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT R-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to malfunctions in incorrect flow measurement, obstructions in primary measuring elements.

RESPONSE DETAIL: For specific CMP UNIT R-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: poorly ventilated or open pits, electrial shock.

CORRECTIVE MAINTENANCE skill and knowledge for PUMPING AND PIPING CMP UNIT . . .

S-10. System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT S-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific conditions: correcting condition with respect to malfunctions in worn pump components--impellers (radial, mixed flow, axial); casings (volute, diffuser, split); packing (seal, mechanical); bearing (e.g., radial, thrust, etc.); shaft (inc. sleeve); couplings; wear rings; piston; air chamber; eccentric; diaphragm; rotor; stator; worn diesel unit components (inc. air starter, fuel injector, lube oil system, thermocouples, cooling water system, control panel); worn magnetic clutch unit components (inc. bearing guide rectifier, load cell, cooling loop, air compressor, rheostat); bubbler system components malfunctioning (inc. differential-pressure cell, air compressor, pressure switches, flow regulator); worn electric motor components (inc. stator and rotor windings, bearings seals); worn speed reducer (inc. gear, actuator, belt); valves inoperative (e.g., gate, check, globe, plug, butterfly, cone, ball, regulating, etc.); clogged, worn or inappropriate pipe fittings (e.g., T's, ells, Caps, Y's, Flanges, eccentric and concentric reducers, etc.); reduced or no output, noise; excessive pressure; loss of pressure; heat build up in piping; clogging; cavitation; lubrication failure; cooling failure; breakage of belts, valve control line, pipeline or valves.

RESPONSE DETAIL: For specific CMP UNIT S-10, the general response (R) above implies appropriate representation of at least the following . . .

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1. Attention to these sources of danger: loose clothing, slippery walks (e.g., grease, oil, ice, etc.), rotating and reciprocating parts; handling contaminated equipment, hot manifolds, engine noise, hot pipe (e.g., steam, engine lube oil, engine cooling water, engine exhaust, etc.), hoist equipment under tension (pressurized or spring loaded).
2. Use of these items of safety equipment: protective clothing (e.g., safety shoes, hard hats, gloves, etc.), flashlights, first aid kit, fire fighting equipment, ear protection, explosion proof flashlight safety solvent, grounded tools and extension cords, lockouts and tags, eye protection.

CORRECTIVE MAINTENANCE skill and knowledge for ELECTRIC POWER CMP UNIT . . .

T-10. *System using delta trasformers, generator, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S	→ R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT T-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting conditions with respect to malfunctions in stoppage of equipment, slow-down of equipment, dimming of lights, sparking, failure of equipment to shut off at specified setting.

RESPONSE DETAIL: For specific CMP UNIT T-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: electrical shock, thermal burns, noise, rotating equipment, flammable solvents, explosive atmosphere.
2. Attention to these high risk activities: activating or deactivating circuits, locking out equipment during repairs.
3. Use of these items of safety equipment: pad locks, ear muffs or ear protector, rubber mats under all switch gear panels, explosion proof flashlight, protective clothing (e.g., rubber boots, safety shoes, rubber electrical gloves, insulated jacket, hard hat, etc.), first aid kit, fire fighting equipment, load break ratings on switchgear, shorting sticks, DO NOT OPERATE tags.

CORRECTIVE MAINTENANCE skill and knowledge for GAS POWER CMP UNIT . . .

U-10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 403:

S →	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP UNIT U-10, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These specific procedures: correcting condition with respect to the malfunctions in leaking or inoperative valve, drip trap; inoperative or inaccurate meter; pressure reducing valve; pressure relief valve, manometer, pressure gages; inoperative flame arrestors or gas booster and motor, excessively high or low pressure, excessive H_2S content, motor control failure to start or stop unit at specified operating levels, inoperative rotary positive displacement compressor and motor, leaking gas sphere.

RESPONSE DETAIL: For specific CMP UNIT U-10, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: gas leakage, excessive high pressure, negative pressure, rotating equipment, abrasions to hands while turning valve handles or using valve chains, explosive mixtures, improper disposal of spent gas scrubber contents, iron sulfide in exposed gas lines and units, hoisting, solvents and wiping or cleaning rags used in painting, belts, couplings.
2. Use of these items of safety equipment: explosion proof equipment, non-sparking tools, explosion meter, hydrogen sulfide amp tools, continuous operation gas monitor, first aid kit, fire fighting equipment, protective clothing (e.g., rubber gloves and boots, hard hat, etc.), salt tablets.

SPECIFIC BEHAVIOR for . . .

LABORATORY CONTROL

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LABORATORY CONTROL skill and knowledge for LABORATORY CMP UNIT . . .

V *(Laboratory Control)*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 501:

→

S	R
When given the task of performing the laboratory control procedures, and confronted with the need to conduct any common laboratory analysis, identified by name, functional description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides, etc.), available for use in the conduct of the tests, and using the reference tools will describe the conduct of sampling and anlysis and the facilities, equipment, and supplies involved; using the reference tools, trainee will actually perform the sampling and analysis in accordance with the most current recommendations as reported by the relevant professional organization.

STIMULUS DETAIL: For specific CMP PROCESS V, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These laboratory analyses: settleable matter, relative stability test, pH, total acidity, total acidity for sludge, volatile acids, alkalinity of wastewater and sludge, suspended solids, total and volatile solids, volatile and suspended solids for activated sludge, settleable solids for activated sludge, S.V.I., S.D.I., sludge age, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, chloride, chlorine residual, chlorine requirement, ammonia nitrogen, nitrate nitrites nitrogen, organic and total Kjeldahl nitrogen, sludge filter ability, % CO_2 (gas), % H_2S (gas), % CH_4 (gas), grease, temperature, coliform orthophosphate mechanical analysis of grit, conductivity.
2. These terms or descriptions (not already implied): all abbreviations and full names of analysis and related chemicals, fixed suspended solids, total fixed solids, total ash, percent organic solids, chlorine requirements.

RESPONSE DETAIL: For specific CMP PROCESS V, the general response (R) above implies appropriate representation of at least the following . . .

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1. Use of these reference tools: standard methods for the waste and wastewater, simplified laboratory proceedings for wastewater examination, chemical rubber handbook, EPA/WQO wastewater analysis.

2. Consideration of this combination of units: all individual units, preliminary units (B, C, D), primary units (B, C, D, E), secondary units (F, G, H, I), sludge handling (J, K, L, M, O, P), total plant (B - Q). (Tests should be run on influent and effluent of combination of units).

Note:		
	preliminary units	(pre)
	primary units	(pri)
	secondary units	(SU)
	sludge handling	(SH)
	total plant	(TP)

3. Taking these laboratory samples at these locations for these analyses: settleable matter [composite - none; grab - E, H, pre, pri, SU, TP], relative stability [composite - none; grab - Q], pH [composite - E, F, G, H, I, J, K, L, M, O, P, Q, pre, pri, SU, SH, TP; grab - A (influent)], total acidity [composite - A (influent); grab - A (influent)], total acidity for sludge [composite - none; grab - K, L], volatile acids [composite - none; grab - K, L, SH], alkalinity of wastewater and sludge [composite - A (influent); grab - K, L, M, SH], total suspended and volatile suspended solids [composite - E, H, pri, SU, TP; grab - E, G, H, Q, pre, pri, SU, TP], total and volatile solids [composite - TP; grab - A (influent), J, K, L, M, O, P, SH], settleable solids for activated sludge [composite - none; grab - G], S.V.I. [composite - none; grab - G], S.D.I. [composite - none; grab - G], sludge age [composite - none; grab - G, SU], dissolved oxygen [composite - none; grab - G, H, I, Q, SU], biochemical oxygen demand [composite - A (influent), E, H, Q, pre, pri, SU, TP; grab - A (influent), E, H, Q, pre, pri, SU, TP], chemical oxygen demand [composite - A (influent), Q, pre, pri, TP; grab - A (influent)], chloride [composite - A (influent); grab - A (influent)], chlorine residual [composite - none; grab - B, N], chlorine requirement [composite - none; grab - B, N], ammonia nitrogen [composite - none; grab - A (influent), Q], nitrate nitrogen [composite - none; grab - Q], organic and total Kjeldahl nitrogen [composite - none; grab - A (influent), Q], % CO_2 [composite - none; grab - K, L, V], % H_2S [composite - none; grab - K, L, V], % CH_4 [composite - none; grab - K, L, V], grease [composite - A, D, E, K, L; grab - A, D, E, K, L], temperature [composite - none; grab - C, K, L], coliform [composite - none; grab - Q], nitrite [composite - none; grab - Q], sludge filterability [composite - L, M, O; grab - L, M, O], orthophosphate [composite - none; grab - Q], conductivity [composite - none; grab - A], mechanical analysis of grit [composite - B; grab - B].

4. Using these tables, graphs, nomographs, and/or performing these calculations: calculations associated with the analyses of settleable matter, relative stability, pH, total acidity, total acidity for sludge, volatile acids, alkalinity of wastewater and sludge, total suspended and volatile suspended solids, total and volatile solids, settleable solids for

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activated sludge, S.V.I., S.D.I., sludge age, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, chloride, chlorine residual, chlorine requirement, ammonia nitrogen, nitrate nitrogen, organic and total Kjeldahl nitrogen, % CO_2, % H_2S, % CH_4, grease, temperature, coliform, nitrite, sludge filterability, orthophosphate, conductivity, mechanical analysis of grit, use of slide rule and calculator for multiplication and division of number including decimals.

LABORATORY CONTROL skill and knowledge for LABORATORY CMP UNIT . . .

V *(Laboratory Control)*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 502:

S →	R
When given the task of determining if a specific plant meets standard requirements and specifications related to quality of wastestream and receiving water . . .	Trainee will recall the name(s) of relevant reference tools needed, and using the reference tools will name the standard analyses and the frequency of these analyses to determine the operational efficiency of specific units or combinations of units.

STIMULUS DETAIL: For specific CMP PROCESS V, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These requirements or specifications: state stream requirements or state effluent requirements, engineers specifications of plant.

RESPONSE DETAIL: For specific CMP PROCESS V, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: flow diagram, U.S.G.S. stream data, engineers preliminary design report, operational reports.
2. Consideration of this combination of units: all individual units, preliminary units (B, C, D), primary units (B, C, D, E), secondary units (F, G, H, I), sludge handling (J, K, L, M, O, P), total plant (B - Q). (Tests should be run on influent and effluent of combination of units).

Note:

preliminary units	(pre)
primary units	(pri)
secondary units	(SU)
sludge handling	(SH)
total plant	(TP)

3. Taking these laboratory samples at these locations for these analyses; settleable matter [composite - none; grab - E, H, pre, pri, SU, TP], relative stability [composite - none; grab - Q], pH [composite - E, F, G,

Continued on following page

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I, J, K, L, M, O, P, Q, pre, pri, SU, SH, TP; grab - A (influent)], total acidity [composite - A (influent); grab - A (influent)], total acidity for sludge [composite - none; grab - K, L], volatile acids [composite - none; grab - K, L, SH], alkalinity of wastewater and sludge [composite - A (influent);grab - K, L, M, SH], total suspended and volatile suspended solids [composite - E, H, pri, SU, TP; grab - E, G, H, Q, pre, pri, SU, TP], total and volatile solids [composite - TP; grab - A (influent), J, K, L, M, O, P, SH], settleable solids for activated sludge [composite - none; grab - G], S.V.I. [composite - none; grab - G], S.D.I. [composite - none; grab - G], sludge age [composite - none; grab - G, SU], dissolved oxygen [composite - none; grab - G, H, I, Q, SU], biochemical oxygen demand [composite - A (influent), E, H, Q, pre, pri, SU, TP; grab - A (influent), E, H, Q, pre, pri, SU, TP], chemical oxygen demand (composite - A (influent), Q, pre, pri, TP; grab - A (influent)], chloride (composite - A (influent); grab - A (influent)], chlorine residual [composite - none; grab - B, N], chlorine requirement [composite - none; grab - B, N], ammonia nitrogen [composite - none; grab - A (influent), Q], nitrate nitrogen [composite - none; grab - Q], organic and total Kjeldahl nitrogen [composite - none; grab - A (influent), Q], % CO_2 [composite - none; grab - K, L, V], % H_2S [composite - none; grab - K, L, V], % CH_4 [composite - none; grab - K, L, V], grease [composite - A, D, E, K, L; grab - A, D, E, K, L], temperature [composite - none; grab - C, K, L], coliform [composite - none; grab - Q], nitrite [composite - none; grab - Q], sludge filterability [composite - L, M, O; grab - L, M, O], orthophosphate [composite - none; grab - Q], conductivity [composite - none; grab - A], mechanical analysis of grit [composite - B; grab - B].

LABORATORY CONTROL skill and knowledge for LABORATORY CMP UNIT . . .

V (Laboratory Control)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 503:

S ⟶	R
Given the task of determining if the results of the laboratory analyses in a specific plant meet standard requirements and specifications related to quality of wastestream and receiving water . . .	Trainee will recall the name(s) of relevant reference tools needed, and using the reference tools will specify if results fall within an acceptable range of values.

STIMULUS DETAIL: For specific CMP PROCESS V, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These laboratory analysis results: settleable matter (ml/l), relative stability (%), pH (units), total acidity (mg/l), total acidity for sludge (mg/l), volatile acids (mg/l), alkalinity of wastewater and sludge (mg/l), suspended solids (mg/l), total and volatile solids (mg/l or %), volatile and suspended solids for activated sludge (mg/l), settleable solids for activated sludge (ml/l), S.V.I. (units), S.D.I (units), sludge age (days), dissolved oxygen (mg/l), biochemical oxygen demand (mg/l), chemical oxygen demand (mg/l), chloride (mg/l), chlorine residual (mg/l), chlorine requirement (mg/l), ammonia nitrogen (mg/l), nitrate nitrogen (mg/l), nitrite (mg/l), organic and total Kjeldahl nitrogen (mg/l), CO_2 gas (%), H_2S gas (%), CH_4 gas (%), grease (mg/l), temperature (degrees), coliform (mpn/100 ml), sludge filterability $[lb/(ft^2)(hr)]$.

RESPONSE DETAIL: For specific CMP PROCESS V, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: flow diagram, engineers preliminary design report, operational reports, state stream requirements or state effluent requirements.
2. Usings these tables, graphs, nomographs, and/or performing these calculations: percent removal or efficiency, detention time, process loading, population equivalent, stream loading.

LABORATORY CONTROL skill and knowledge for LABORATORY CMP UNIT . . .

V *(Laboratory Control)*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 504:

S $\longrightarrow$	R
When considering the conduct of a specific laboratory analysis, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the analysis related directly to employee safety, including how (why) they protect the employee.

STIMULUS DETAIL: For specific CMP PROCESS V, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These laboratory analyses: settleable matter, relative stability, pH, total acidity, total acidity for sludge, volatile acids, alkalinity of wastewater and sludge, suspended solids, total and volatile solids, volatile and suspended solids for activated sludge, settleable solids for activated sludge, S.V.I., S.D.I., sludge age, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, chloride, chlorine residual, chlorine requirement, ammonia nitrogen, nitrate, nitrite, nitrogen, organic and total Kjeldahl nitrogen, % CH_4 (gas), % CO_2 (gas), % H_2S (gas), sludge filterability, grease, temperature, coliform orthophosphate, all abbreviations and full names of analysis and related chemicals, mechanical analysis of grit, conductivity.
2. These terms or descriptions (not already implied): all abbreviations and full names of analysis and related chemicals, fixed suspended solids, total fixed solids, total ash, percent organic solids, chlorine requirement.

RESPONSE DETAIL: For specific CMP PROCESS V, the general response (R) above implies appropriate representation of at least the following . . .

1. Attention to these sources of danger: broken glass, dangerous chemicals, hot containers, compressed gas, toxic fumes, leaving hot plates on when not in use.

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2. Attention to these high risk activities: handling of glassware (e.g., making rubber to glass connections, etc.); handling of chemicals, (e.g., concentrate acids and bases, etc.); exposure to toxic fumes (e.g., chlorine gas cylinders, chloroform, and volatile solvents, etc.); pipetting chemicals or other liquids.
3. Use of these items of safety equipment: first aid kit, laboratory apron, safety glasses, suction bulbs for pipettes, ventilated hood, exhaust fan, shower, fire extinguisher, safety blanket, asbestos gloves, tongs, rubber gloves, face shield, safety manual, emergency phone number (e.g., doctor, ambulance, fire department, etc.), safety shower and eye washer, boric acid and bicarbonate solutions.

SPECIFIC BEHAVIOR for . . .

SYSTEMS INTERACTION

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SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

601 A - U

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS of . . .

A - U (*Operational Processes of the Composite Model Plant*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 601:

S	⟷ R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with the actual condition(s) of the wastewater entering or of the wastestream within the plant, or a verbal description or other standard representation thereof . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the process unit(s) directly involved in dealing with the condition(s) and will describe how the unit(s) deal with the specified condition(s).

STIMULUS DETAIL: For units of CMP PROCESS A - U, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these characteristics of the wastestream: flow (high, low), level (high, low), temperature (high, low), pH (high, low), color, odor (e.g., H_2S, hydrocarbons, etc.), toxic gases, floating material (e.g., rags, sticks, etc.), turbidity (high, low), suspended solids (high, low), industrial wastes (e.g., heavy metals, oils, etc.), septic sewage, oil, grease, velocity, sludge density (high, low), calorific value (high, low), grit composition (inorganic, organic), BOD, COD, foam, DO, ice, gas (inc. CO_2, CH_4, H_2S), alkalinity (high, low), settleable matter, relative stability, acidity, volatile acids, volatile solids, S.V.I., S.D.I., sludge age, chloride, chlorine residual, chlorine demand, ammonia nitrogen, nitrite nitrogen, nitrate nitrogen, organic and total Kjeldahl nitrogen, coliforms, orthophosphate, conductivity, sludge filterability.

RESPONSE DETAIL: For units of CMP PROCESS A - U, the general response (R) above implies appropriate representation of at least the following . . .

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Continued from previous page, Specific Behavior 601 A - U

1. Consideration of these wastestream conditions as they relate to various process units:

   Flow as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V
   Level as it relates to A, C, D, E, F, G, H, I, K, L, N, O, R
   Temperature as it relates to A, E, F, I, J, K, L, P
   pH as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, R, S, Q
   Color as it relates to A, B, E, F, G, I, Q
   Odor as it relates to A, B, E, F, G, I, K, L, N, P, Q
   Toxic gases as they relate to A, B, C, K, L, U
   Floating material as it relates to A, C, D, E, H, I, Q
   Turbidity as it relates to D, E, F, G, H, I, Q
   Suspended solids as they relate to D, E, F, G, H, I, Q
   Industrial wastes as they relate to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, S, Q
   Septic sewage as it relates to A, B, D, E, F, G, I, K, Q
   Oil as it relates to A, B, E, Q
   Grease as it relates to A, B, E, H, Q
   Velocity as it relates to A, B, C, D, E, F, G, H, I, N, R, S
   Sludge density as it relates to E, H, J, K, L, M, O, P, Q, R, S
   Calorific value as it relates to P
   Grit composition as it relates to D, Q
   BOD as it relates to B, E, F, G, H, I, J, L, N, O, Q
   COD as it relates to B, E, F, G, H, I, J, L, N, O, Q
   Foam as it relates to A, B, E, G, I, Q
   DO as it relates to A, B, G, H, I, Q
   Ice as it relates to A, C, D, E, F, G, H, I, Q, R, S
   Gas as it relates to K, L, U
   Alkalinity as it relates to I, J, K, L, M, O
   Settleable matter as it relates to A, D, E, I, Q
   Relative stability as it relates to B, F, G, I, N, Q
   Acidity as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, R, S, Q
   Volatile acids as they relate to K, L
   S. V. I. as it relates to G
   S. D. I. as it relates to G
   Sludge age as it relates to G
   Chloride as it relates to E, Q
   Chlorine residual as it relates to N, Q
   Chlorine demand as it relates to B, N, Q
   Ammonia nitrogen as it relates to E, F, G, I, K, L, Q
   Nitrite nitrogen as it relates to E, F, G, I, Q
   Nitrate nitrogen as it relates to E, F, G, I, Q
   Organic and total Kjedahl nitrogen as they relate to E, F, G, I, K, L, Q
   Coliforms as they relate to B, F, G, I, N, Q
   Orthophosphate as it relates to E, F, G, I, Q
   Conductivity as it relates to E

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2. Consideration of these process variations: trickling filter (roughing, polishing, standard rate, high rate, single stage, two stages), aeration (conventional, step, tapered, complete mix, contact stabilization, biosorption, modified high rate, extended aeration, aerated lagoon, Kraus).
3. Essential use of these terms (not already implied): recirculation.

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS of . . .

A - U *(Operational Processes of the Composite Model Plant)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 602:

$\longrightarrow$

S	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with an actual common industrial waste, or a common name, verbal description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe the possible effect(s) of the waste (if present in plant's influent) on the plant's treatment process and on the receiving stream.

STIMULUS DETAIL: For units of CMP PROCESS A - U, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These wastes: metal wastes (chromates), phenolic wastes, dairy wastes, cannery wastes, petrochemical, pesticide, cyanides, acid wastes, alkaline wastes, volatile organic wastes, inorganic solids (dissolved and particulate) meat packing, textile wastes, tannery wastes, pharmaceutical, brewery, distillery, explosive and flammable, paper and pulp, laundry, radioactive wastes.

RESPONSE DETAIL: For units of CMP PROCESS A - U, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: industrial waste survey, waste treatability studies, industrial waste texts and journals, plant flow diagrams.
2. Consideration of these effects: corrosion, deposition, slime growths, chlorine demand, plugging, wear of equipment, overload of mechanical equipment, overload of process unit (e.g., organic, solids or hydraulic, etc.), loss of biological growth, impairment of capacity, upset of chemical equilibrium, health risk to persons, explosion hazard, biological kills, economic loss, esthetic and recreational losses.

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3. Consideration of these industrial wastes as they affect various process units:

   Metal as it relates to A, E, F, G, I, K, L, Q
   Phenolic as it relates to A, B, F, G, I, K, L, N, Q
   Dairy as it relates to A, B, F, G, I, K, L, Q
   Cannery as it relates to A, B, C, D, E, F, G, H, I, K, L, Q
   Petrochemical as it relates to A, B, E, F, G, I, K, L, Q, P
   Pesticide as it relates to A, F, G, I, K, L, Q
   Cyanide as it relates to A, B, F, G, I, K, L, N, Q
   Acid as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, S
   Alkaline as it relates to A, F, H, I, K, L, Q
   Volatile organic as it relates to A, B, F, G, I, K, L, Q
   Inorganic solids as they relate to A, E, F, G, I, K, P, Q
   Meat as it relates to A, C, D, E, F, G, I, K, L, N, Q, S
   Textile as it relates to A, C, E, F, G, I, K, L, Q
   Tannery as it relates to A, C, D, E, F, G, I, K, L
   Pharmaseutical as it relates to A, B, F, G, I, K, L, Q
   Brewery as it relates to A, F, G, I, P, Q
   Distillery as it relates to A, F, G, I, Q
   Explosive, flammable as they relate to A, P
   Pulp and paper as they relate to A, B, C, D, E, F, G, I, K, L, Q
   Laundry as it relates to A, F, G, I, Q
   Radioactive as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q

4. Consideration of these process variations: trickling filter (roughing, polishing, standard rate, high rate, single stage, two stages), aeration (conventional, step, tapered, complete mix, contact stabilization, biosorption, modified high rate, extended aeration, aerated lagoon, Kraus.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

603 A - U

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS of . . .

A - U *(Operational Processes of the Composite Model Plant)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 603:

S →	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the purpose of the process unit within a treatment plant and how its function relates to other units within the plant.

STIMULUS DETAIL: For units of CMP PROCESS A - U, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These process units:

Collection - Combined system with industrial waste
Prechlorination - Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electrical evaporator
Screening and grinding - Mechanically cleaned bubbler control unit with grinder
Grit removal - Aerated unit with bucket elevator
Primary sedimentation - Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper
Trickling filtration - Rotary distributor, standard rate unit with dosing tank
Aeration - Diffused air unit with swing type diffuser producing fine bubbles
Secondary sedimentation - Circular, peripheral feed unit with suction
Pond stabilization - Aerobic pond
Thickening - Floatation unit with air
First stage digestion - Fixed cover, gas recirculation unit with external heat exchanger
Second stage digestion - Floating cover unit with gas storage
Sludge conditioning - Chemical conditioning unit with counter-current elutriation
Postchlorination - Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control
Sludge dewatering - Vacuum filter unit with cloth; Continuous feed centrifuge unit

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Solids disposal - Multiple hearth incinerator unit
Effluent disposal - Direct reuse system
Flow measurement - Centralized recording and totalizing system including Parshall flume, Venturi meter, magnetic flow meter, and rotameter
Pumping and piping - System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto.
Electric power - System using delta transformers, generators, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms
Gas power - System with internally produced gas with high pressure tanks and rotary positive displacement compressors

RESPONSE DETAIL: For units of CMP PROCESS A - U, the general response (R) above implies appropriate representation of at least the following . . .

1. Consideration of these reasons or causes: collection of domestic wastewater, floating solids, industrial wastewater, storm water; removal of odor, color, floating solids, suspended solids, settleable solids, colloids, dissolved solids, biological solids, ammonia - N, nitrate - N, phosphorous, organic - N, total nitrogen, chlorine demand, BOD, COD, coliforms; reduction of odor, color, floating solids, suspended solids, settleable solids, colloids, dissolved solids, biological solids, ammonia - N, nitrate - N, organic - N, total - N, phosphorous, chlorine demand, BOD, COD, total and volatile solids; production of gas (inc. methane, CO_2, nitrogen), soil conditioner, reuseable water.
2. Consideration of these process units as they relate to various other process units:

A as it relates to B, C, D, E, F, G, H, I, R, S, Q
B as it relates to E, F, G, I, Q, S
C as it relates to D, E, F, G, I, K, P, Q, S
D as it relates to E, G, H, I, K, L, P, Q, R, S
E as it relates to F, G, H, I, J, K, L, M, O, P, Q, R, S
F as it relates to H, Q, R, S
G as it relates to H, Q, R, S
H as it relates to F, G, J, K, L, M, N, O, P, Q, S
I as it relates to N, Q, R, S
J as it relates to K, L, N, O, P, S
K as it relates to L, S
L as it relates to M, O, P, R, S
M as it relates to O, P, R, S
N as it relates to Q, S
O as it relates to P, S
P as it relates to S

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Q as it relates to B, C, D, E, F, G, H, I, J, K, L, M, N, O
R as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, S
S as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R
T as it relates to A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S
U as it relates to K, L, S

3. Consideration of these process variations: trickling filter (roughing, polishing, standard rate, high rate, single stage, two stage), aeration (conventional, step, tapered, complete mix, contact stabilization, biosorption, modified high rate, extended aeration, aerated lagoon, Kraus).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS of . . .

A - U *(Operational Processes of the Composite Model Plant)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 604:

S →	R
When given the task of planning the laboratory control procedures of a specific plant . . .	**Trainee will recall the name(s) of relevant reference tools needed, and using the reference tools will identify appropriate sampling locations and will describe the significance to the plant as a whole of each sampling location.**

STIMULUS DETAIL: For units of CMP PROCESSES A - U, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These types of plants with flows up to 10 MGD:

   Primary plant including process units **A, B, C, D, E, J, K, L, M, N, O, P, Q, R, S, T, U**
   Secondary plant including process units **A, B, C, D, E, F, H, J, K, L, M, N, O, P, Q, R, S, T, U**
   Secondary plant including process units **A, B, C, D, E, G, H, J, K, L, M, N, O, P, Q, R, S, T, U**
   Lagoon including process units **A, I, Q, R, S, T**

RESPONSE DETAIL: For units of CMP PROCESSES A - U, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: **standard methods for the examination of water and wastewater, simplified laboratory procedures for wastewater examination, plant flow diagram.**
2. Consideration of this combination of units: **all individual units, preliminary units (B, C, D), primary units (B, C, D, E), secondary units (F, G, H, I), sludge handling (J, K, L, M, O, P), total plant (B - Q). (Tests should be run on influent and effluent of combination of units).**

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Continued from previous page, Specific Behavior 604 A - U

Note:

preliminary units	(pre)
primary units	(pri)
secondary units	(SU)
sludge handling	(SH)
total plant	(TP)

3. Taking these laboratory samples at these locations for these analyses: settleable matter [composite - none; grab - E, H, pre, pri, SU, TP], relative stability [composite - none; grab - Q], pH [composite - E, F, G, H, I, J, K, L, M, O, P, Q, pre, pri, SU, SH, TP; grab - A (influent)], total acidity [composite - A (influent); grab - A (influent)], total acidity for sludge [composite - none; grab - K, L], volatile acids [composite - none; grab - K, L, SH], alkalinity of wastewater and sludge [composite - A (influent); grab - K, L, M, SH], total suspended and volatile suspended solids [composite - E, H, pri, SU, TP; grab - E, G, H, Q, pre, pri, SU, TP], total and volatile solids [composite - TP; grab - A (influent), J, K, L, M, O, P, SH], settleable solids for activated sludge [composite - none; grab - G], S.V.I. [composite - none; grab - G], S.D.I. [composite - none; grab - G], sludge age [composite - none; grab - G, SU], dissolved oxygen [composite - none; grab - G, H, I, Q, SU], biochemical oxygen demand [composite - A (influent), E, H, Q, pre, pri, SU, TP; grab - A (influent), E, H, Q, pre, pri, SU, TP], chemical oxygen demand [composite - A (influent), Q, pre, pri, TP; grab - A (influent)], chloride [composite - A (influent); grab - A (influent)], chlorine residual [composite - none; grab - B, N], chlorine requirement [composite - none; grab - B, N], ammonia nitrogen [composite - none; grab - A (influent), Q], nitrate nitrogen [composite - none; grab - Q], organic and total Kjeldahl nitrogen [composite - none; grab - A (influent), Q], % CO_2 [composite - none; grab - K, L, V], % H_2S [composite - none; grab - K, L, V], % CH_4 [composite - none; grab - K, L, V], grease [composite - A, D, E, K, L; grab - A, D, E, K, L], temperature [composite - none; grab - C, K, L], coliform [composite - none; grab - Q], nitrite [composite - none; grab - Q], sludge filterability [composite - L, M, O; grab - L, M, O], orthophosphate [composite - none; grab - Q], conductivity [composite - none; grab - A], mechanical analysis of grit [composite - B; grab - B].

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

605 A - U

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS of . . .

A - U *(Operational Processes of the Composite Model Plant)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 605:

S →	R
When given the task of making preliminary proposals regarding the wastewater treatment needs of a specific community area . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will name the most probable processes needed in a treatment plant to meet the conditions indicated and will prepare a simple line diagram showing the relationship of the named processes.

STIMULUS DETAIL: For units of CMP PROCESSES A - U, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These types of communities: populations of 5,000; 10,000; 25,000; 50,000.

RESPONSE DETAIL: For units of CMP PROCESSES A - U, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: census records, USGS stream data, state stream requirements or state effluent requirements, river basin planning studies.
2. Use of these types of data: STORET laboratory reports, wastewater flow records, trends (e.g., population, economic, industrialization, recreation, etc.).
3. These types of plants with flows up to 10 MGD:

   Primary plant including process units A, B, C, D, E, J, K, L, M, N, O, P, Q, R, S, T, U
   Secondary plant including process units A, B, C, D, E, F, H, J, K, L, M, N, O, P, Q, R, S, T, U
   Secondary plant including process units A, B, C, D, E, G, H, J, K, L, M, N, O, P, Q, R, S, T, U
   Lagoon including process units A, I, Q, R, S, T

SYSTEMS INTERACTION skill and knowledge for ALL PRINCIPAL CMP UNITS of . . .

A - U *(Operational Processes of the Composite Model Plant)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 606:

S →	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with an actual *major* disaster (condition) that is in either a possible, pending, or occurred status, or a verbal description or other standard representation thereof . . .	Trainee will recognize the disaster as such and, from recall, will identify the probable related operational disruptions, plant damages, and threats to health, and will recall the names of relevant reference tools (e.g., guides, etc.) available for use, and using the reference tools will describe the indicated immediate and/or long term preventive and/or corrective measures; using the reference tools trainee will actually perform the indicated procedure.

STIMULUS DETAIL: For units of CMP PROCESSES A - U, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These conditions or these characteristics: flood, earthquake, war, sabotage, fire, explosion, structural failure, total process unit failure.

RESPONSE DETAIL: For units of CMP PROCESSES A - U, the general response (R) above implies appropriate representation of at least the following . . .

1. Consideration of these effects: loss of life, injury, illness, detrimental effect on receiving water, public health, destruction or damage to unit processes and associated components, overload of unit processes, contamination of surrounding environment, loss of supplies and records.
2. Consideration of these points: emergency and long term public notice; dealings with unions; legal, insurance, governmental officials (e.g., police, fire, health, civil defense, etc.); design engineers.

Continued on following page

Continued from previous page, Specific Behavior 606 A - U:

3. Use of these reference tools: plans of related organizations (e.g., civil defense, fire department, police department, Corps of Engineers, public health service, etc.), flow diagram, engineering design specifications, "as-built" plans, "WPCF manual #11", equipment manufacturers manual, plant operational and maintenance manual, disaster plan for plant.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - A

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

A (*Collection*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS A, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: sanitary system with industrial waste, combined system without industrial waste, sanitary system without industrial waste, storm system, industrial system.

RESPONSE DETAIL: For units of CMP PROCESS A, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-A

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.

3. Essential use of these terms (not already implied): flow variations, corrosiveness, overflow regulation.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

B (*Prechlorination*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	**Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.**

STIMULUS DETAIL: For units of CMP PROCESS B, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: vacuum chlorinator with automatic feed to pipe, electrical control, and electrical evaporator; solution feed chlorinator with discharge to pipe; solution feed chlorinator with discharge to channel; solution feed chlorinator with discharge to basin; vacuum chlorinator with electrical evaporator and discharge to channel; vacuum chlorinator with electrical evaporator and discharge to basin; chlorinator with only manual control.

RESPONSE DETAIL: For units of CMP PROCESS B, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-B

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): solution, feed, dry chlorine handling, mixing, manual feed.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - C

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

C (*Screening and Grinding*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS C, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: mechanically cleaned electrode control unit with grinder, mechanically cleaned timer control unit without grinder, mechanically cleaned electrode control unit without grinder, mechanically cleaned float control unit without grinder, mechanically cleaned manual control unit without grinder, mechanically cleaned bubbler control unit without grinder, mechanically cleaned timer control unit with grinder, mechanically cleaned float control unit with grinder, mechanically cleaned manual control unit with grinder, comminution unit, fine screen unit, disc screen unit, band screen unit, drum screen unit, oscillating screen unit, hand cleaned rack unit, wire wedge screen unit.

RESPONSE DETAIL: For units of CMP PROCESS C, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 607-C

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.
2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): control method, mechanical configuration.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - D

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

D (Grit Removal)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS D, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: aerated unit with screw conveyor, aerated unit with air lift, aerated unit with clam shovel, velocity control unit with screw conveyor, velocity control unit with bucket elevator, velocity control unit with clam shovel, surface overflow unit with screw conveyor, surface overflow unit with bucket elevator, surface overflow unit with rake, cyclone unit.

RESPONSE DETAIL: For units of CMP PROCESS D, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-D

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): mechanical configuration (type of removal), primary removal method.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

E (*Primary Sedimentation*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS E, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: circular unit with telescopic valve draw off, density meter time clock, and trough with scraper; rectangular unit with sight glass, direct draw off, and trough with scraper; rectangular unit with sight glass, direct draw off, and helical skimmer; circular unit with sight glass, trough with scraper, and direct sludge draw off; circular unit with sight glass, trough with scraper, and telescopic valve draw off; rectangular unit with helical skimmer and density meter time clock; rectangular unit with helical skimmer and telescopic valve draw off; square unit; imhoff tank; septic tank; lagoon; two story mechanical unit; evacuator unit.

RESPONSE DETAIL: For units of CMP PROCESS E, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 607-E

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.
2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): sludge removal method, scum removal method, mechanical equipment, control methods.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

F (*Trickling Filtration*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS F, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: rotary distributor, high rate unit; rotary distributor, roughing unit; fixed nozzle unit.

RESPONSE DETAIL: For units of CMP PROCESS F, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts,

Continued on following page

Continued from previous page, Specific Behavior 607-F

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Consideration of these process variations: trickling filter (roughing, polishing, standard rate, high rate, single stage, two stages).
4. Essential use of these terms (not already implied): distribution, rate of application, position in plant.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

G (*Aeration*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS G, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: mechanical aeration unit with turbine and sparger, diffused air unit with fixed type diffuser producing fine bubbles, diffused air unit with swing type diffuser producing large bubbles, diffused air unit with fixed type diffuser producing large bubbles, flat plate diffuser, mechanical aeration unit with brush, mechanical aeration unit with propeller, ejector nozzle aeration unit, ejector aeration unit, oxygen aeration unit.

RESPONSE DETAIL: For units of CMP PROCESS G, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-G:

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Consideration of these process variations: aeration (conventional, step, tapered, complete mix, contact stabilization, biosorption, modified high rate, extended aeration, aerated lagoon, Kraus.
4. Essential use of these terms (not already implied): method of air application, mechanical configuration, type of gas used.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - H

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

H *(Secondary Sedimentation)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS H, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: circular, center feed unit with suction; rectangular unit; circular, center feed unit with scraper; circular, peripheral feed unit with scraper; tube settler unit; square unit.

RESPONSE DETAIL: For units of CMP PROCESS H, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-H:

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): shape, method of sludge collection, method of flow distribution.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

I (*Pond Stabilization*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS I, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: facultative pond, anaerobic pond.

RESPONSE DETAIL: For units of CMP PROCESS I, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-I

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): principle, odors, efficiency.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - J

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

J (*Thickening*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS J, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: floatation unit with vacuum, stirring and settling unit, centrifuge unit.

RESPONSE DETAIL: For units of CMP PROCESS J, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-J

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): mechanical equipment, sludge removal.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

K (*First Stage Digestion*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS K, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: floating cover, gas recirculation unit with external heat exchanger, aerobic digester unit, fixed cover unit with turbo mix, fixed cover unit with hot water coil heat, septic tank, imhoff tank.

RESPONSE DETAIL: For units of CMP PROCESS K, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts; manufacturers manuals.

Continued on following page

Continued from previous page, Specific Behavior 607-K

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): mixing method, heating method, mechanical equipment.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - L

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

L *(Second Stage Digestion)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS L, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: fixed cover unit, aerobic digester unit.

RESPONSE DETAIL: For units of CMP PROCESS L, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-L

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): principle, gas handling, mechanical equipment.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - M

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

M (*Sludge Conditioning*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS M, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" disignators from the CMP: multi-stage elutriation unit, single stage elutriation unit, unit using Laboon process, unit using Heymann process.

RESPONSE DETAIL: For units of CMP PROCESS M, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts; chemical supply catalogs.

Continued on following page

Continued from previous page, Specific Behavior 607-M

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): mechanical equipment.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

N *(Postchlorination)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS N, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: vacuum chlorinator with automatic feed to pipe and close loop electrical control, solution feed chlorinator with discharge to pipe, solution feed chlorinator with discharge to channel, solution feed chlorinator with discharge to basin, vacuum chlorinator with discharge to channel, vacuum chlorinator with discharge to basin, chlorinator with only manual control.

RESPONSE DETAIL: For units of CMP PROCESS N, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-N

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): solution, feed, dry chlorine handling, mixing manual feed, control instrumentation.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

O (Sludge Dewatering)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S $\longrightarrow$	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS O, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: vacuum filter unit with coil, drying beds, sludge press unit, sludge lagoon.

RESPONSE DETAIL: For units of CMP PROCESS O, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

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Continued from previous page, Specific Behavior 607-0

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): principle, mechanical equipment.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - P

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

P (*Solids Disposal*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS P, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: fludized bed incinerator unit, burial, soil conditioner, water grate incinerator unit, unit using Zimmerman Process.

RESPONSE DETAIL: For units of CMP PROCESS P, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-P

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): mechanical equipment, control systems final product.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - Q

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

Q (*Effluent Disposal*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S ⟶	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS Q, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: underground disposal system, dilution system, irrigation system, intermittent sand filter unit as used in tertiary treatment, precipitation unit as used in tertiary treatment, ion exchange unit as used in tertiary treatment, adsorption unit as used in tertiary treatment, ponds as used in tertiary treatment, freezing unit as used in tertiary treatment, nutrient removal unit as used in tertiary treatment, microscreen unit as used in tertiary treatment, reverse osmosis unit as in tertiary treatment, electrodialysis unit as used in tertiary treatment, pressure filter unit as used in tertiary treatment, reaeration unit as used in tertiary treatment.

RESPONSE DETAIL: For units of CMP PROCESS Q, the general response (R) above implies appropriate representation of at least the following . . .

Continued on following page

Continued from previous page, Specific Behavior 607-Q

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts; "Advanced Waste Treatment Manuals", E.P.A., WPCF.
2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): disposed to; mechanical equipment; principle, pressure, chemical, physical.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

607 - R

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

R *(Flow Measurement)*

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS R, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: V notch weir unit, rectangular weir unit, proportional flow weir unit, kennison nozzle unit.

RESPONSE DETAIL: For units of CMP PROCESS R, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-R

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.

3. Essential use of these terms (not already implied): principle, pressure, head, shape, application.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

S (Pumping and Piping)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS S, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: system with air lift pump, system with screw lift pump, system with hand driven pump, system with water driven pump, system with air driven pump, system with pneumatic ejector pump electrode controlled.

RESPONSE DETAIL: For units of CMP PROCESS S, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-S

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): power source, application, principle, control.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

T (*Electric Power*)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS T, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: system using Y transformers, generators, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms, system using outside generated power with manually controlled circuit motor starters.

RESPONSE DETAIL: For units of CMP PROCESS T, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or components manufacturers lists, bulletins, and catalogs; wastewater treatment manuals, journals, and texts; "Electricity Made Simple Book" or similar type manual.

Continued on following page

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2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): type of connection, type of control.

SYSTEMS INTERACTION skill and knowledge for ALL CMP UNITS of . . .

U (Gas Power)

as they relate to the GENERAL CRITERION BEHAVIOR NUMBER 607:

S →	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

STIMULUS DETAIL: For units of CMP PROCESS U, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. The units, or unit components, implied by these "OTHER" designators from the CMP: system with internally produced gas with high pressure tanks and reciprocating compressors, system with internally produced gas with gas holder covers and centrifugal blowers, system with externally produced gas.

RESPONSE DETAIL: For units of CMP PROCESS U, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: process unit or component manufacturers lists, bulletins, and catalogs; laboratory reports; operations manuals; wastewater treatment manuals, journals, and texts.

Continued on following page

Continued from previous page, Specific Behavior 607-U

2. Consideration of these parameters: Comparative (simply more or less); capital, operation, and maintenance costs; flow handling capabilities; waste handling capabilities (e.g., types, etc.); efficiency capability; degree of control achievable; reliability (freedom from failure); dependency on surrounding environment (e.g., soil, etc.); personnel monitoring required; parts requirements and availability; skills needed for operation and maintenance; resistance to upset; nuisance to neighbors; land requirements.
3. Essential use of these terms (not already implied): gas storage, mechanical equipment, pressures.

SPECIFIC BEHAVIOR for . . .

MANAGEMENT/SUPERVISORY

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MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (Management/Supervisory)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 701:

S →	R
When given the task of placing orders for service or parts, and confronted with an actual process unit, or unit component, by common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., catalogs, etc.) available for use and using the reference tools will actually prepare a purchase or service order form listing all relevant information.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These components:

- For Process A (Collection) . . .

  sewer (e.g., interceptor, collector, lateral, branch, main, pressure, etc.), house connection, sewer tap, pipe joints (e.g., O-ring, compression, bituminous, hydraulic, mortar, epoxy mortar, etc.), manholes, tap line for new connections, inverted siphon, dosing tank, manhole covers (unsealed and sealed), regulators, weirs (e.g., side overflow, leaping, etc.), flap gates, catch basins, fire fighting equipment, first aid kit.

- For Process B (Prechlorination) . . .

  regulators (chlorine pressure, injector vacuum, water pressure), cut chart, gas rate controller, rotameter float, cylinders, vent fan, pigtails (inc. caps), valves (e.g., header, pressure relief, pressure reducing, cylinder, etc.), hoist, chart drive, recording chart, pen, compressor, drive belt, motor, air storage tank, scales, pneumatic control device, alarm system (e.g., leak detection device, chlorine pressure, evaporator, water level, etc.), evaporator, rupture disc, first aid kit, fire fighting equipment, air filters, cam follower.

- For Process C (Screening and Grinding) . . .

  chain (inc. attachment links, link pins, cotter pins, shear pins), sprockets, rakes (inc. angle, attachment bolts), rake cleaner (inc. shock absorber, connector), screenbelt (inc. adjustment mechanism, scraper, rollers), rake drive (inc. motor, gear box, drive chain,

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sprockets), belt drive (inc. motor, gear box, drive belts, pulleys), bar screen enclosure (inc. doors, covers), shaft grinder (inc. motor, drive belt, pulleys), bubbler control, flush water device, alarm, bar rack, flushing valve, electrical overload device, fire fighting equipment, screen housing, troughs, hopper, bars, gears, bearings, speed reducers, sensors, bushings, relays, baffles.

- For Process D (Grit Removal) . . .

  blower, motor and mounting, speed reducer, manifold, piping, weir, air pressure relief, silencer, air cleaner, electrical control equipment, couplings, pressure indicating device, baffles, diffusers, tank, gear box, receiving hopper, chains (inc. shear pins, special links, link pins, cotter pins), buckets, shoes, guide rails, sprockets, shafts (inc. bearings), belts, tighteners, blower and bucket drive speed controls, valves (control, check), fire fighting equipment, first aid kit, grit removal assembly, chutes, hoppers, rising stem valves, plug valves, packing, V-belts.

- For Process E (Primary Sedimentation) . . .

  flights, drive motor, gear box, sprockets, chain, clutch, shear pins, skimmer trough, grease pit, sludge wells, telescopic valve (inc. wheel, stem, indicator), time clock, density meter, weirs, piping, valves (inc. gate, plug, ball, check), pumps, motors, water seal units, belts, pulleys, limit switch, variable speed drive, rails, shoes, sluice gates, baffles, first aid kit, fire fighting equipment, shaft (inc. bearings), packing.

- For Process F (Trickling Filtration) . . .

  dosing tank (inc. piping, bell, structure), rotary distributor (inc. ports, rotation speed), media (inc. biological growth), structure (inc. underdrains), blow-off pipe, siphon breaker, motors, belts, fans, vents, first aid kit, nozzles, screens, motor and fan bearings, mercury seal, guy lines, deflector plates.

- For Process G (Aeration) . . .

  motors, blowers, manometers, pumps, indicator lights, diffuser tubes, header, indicator gages, meters (e.g., flow, blower, primary effluent, return sludge, air, etc.), foam spray system, fire fighting equipment, first aid kit, valves (e.g., gate, plug, ball, check, etc.), swing joints, tachometers, indicating gages (e.g., oil pressure, temperature, etc.).

- For Process H (Secondary Sedimentation System) . . .

  collector sweeps, drive motor, gear box, shear pin, skimming device (e.g., sprays, telescopic valve, etc.), weirs, valves (gate, plug, ball, check), gates (sluice, shear), baffles, pumps, motors, water seal units, belts, pulleys, coupling, limit switch, variable speed drive, control hoops, indicators (e.g., flow, return rate, etc.), suction arms, bearings, first aid kit, fire fighting equipment.

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- For Process I (Pond Stabilization) . . .

  algae, influent and effluent lines, levee, pumps, motors, valves, chemical conditioning units, diversion box, comminutor, first aid kit, fire fighting equipment, dikes, fence, switches, samplers.

- For Process J (Thinkening) . . .

  skimmer, chain, sprocket, flights, track, drive motor, gear reducer and drive chain, screw drive motor, overflow weir, pressure tanks, pressure tank regulator valve, sight glass, air compressor, pulley, drive belts, control board (inc. air pressure gages), butterfly valve, pumps, gear box, first aid kit, fire fighting equipment, skimmers, pump stuffing box, pressure relief system, pump packing gland, air and oil filters.

- For Process K (First Stage Digestion) . . .

  gas recirculation system (inc. compressor, oiler, pressure gage, valve timer, valves), heat exchanger (inc. exhaust fan, pilot light assembly, flame, hot water recirculation pump), recirculation pump (inc. motor), sludge pump (inc. motor, variable speed drive, belt, pulley), manometers, pressure and vacuum relief valves, water traps, meters (e.g., sludge flow, density, gas, etc.), piping, sight glasses, hatches.

- For Process L (Second Stage Digestion) . . .

  pump, motor, variable speed drive, drive belt, manometer, floating cover, vacuum and pressure relief valves, piping, sight glasses, hatches.

- For Process M (Sludge Conditioning) . . .

  tanks, pumps, flights, collector, chains (e.g., links, link pins, shear pins, etc.), sprockets, shafts, motors, speed reducers, couplings, rails, shoes, valves, flow meters, overload alarms, chemical conditioning tank [e.g., agitator drive, chemical feed pumps (speed reducers and controls)], chemical day tanks, chemical feeders, slakers (e.g., paste, liquid, etc.), fire fighting equipment, first aid kit, control loops (e.g., pH, etc.), mixers, weirs, gear box, bucket elevators, rotameters.

- For Process N (Postchlorination)

  regulators (chlorine pressure, injector vacuum, water pressure), cut chart, gas rate controller, rotameter float, cylinders, vent fan, pigtails (inc. caps), valves (e.g., header, pressure relief, pressure reducing, cylinder, etc.), hoist, chart drive, recording chart, pen, compressor, drive belt, motor, air storage tank, scales, pneumatic control device, alarm system (e.g., leak detection device, chlorine pressure, evaporator, water level, etc.), evaporator, rupture disc, first aid kit, fire fighting equipment, air filters, cam follower, analyzer, tubes, filters, sample pump and motor.

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- For Process O (Sludge Dewatering) . . .

  blower; vacuum, filtrate and sludge pumps (inc. motor, pulley, belt); vacuum gage; agitator (inc. motor, variable speed drive); conveyor belt; rollers; scrapers; chemical conditioning apparatus; rotameters; mixing tank (inc. stirrer); oil valve; first aid kit; fire fighting equipment; trunnion; sludge pump; motor (inc. bearings); pressure gage; variable speed drive (inc. belt, pulley); centrifuge (inc. motor, drive belt, amperage gage).

- For Process P (Solids Disposal) . . .

  rake, drive motor, fan and motor, conveyor belt, ash hopper, ash pump, gears, drive belt, rake, first aid kit, rollers.

- For Process Q (Effluent Disposal) . . .

  pumps, pipes, channels, bearings, valves, couplings, filters, first aid kit, fire fighting equipment, packing.

- For Process R (Flow Measurement) . . .

  Parshall flume (inc. stilling well, float, float switch, flow indicator, transmitter, Venturi meter (inc. flushing pump, sight glass, plunger, flow indicator, transmitter), magnetic flow meter (inc. flow indicator, flow recorder, transmitter), rotameter (inc. flow indicator, flow recorder, transmitter), receivers, totalizers, pens, charts, signal converters, meter bore, ports, strainers, housing, cams, mechanical linkage.

- For Process S (Pumping and Piping) . . .

  couplings, speed controllers, control systems and activators, motors, diesels, valves, piping, fittings, gages (e.g., vacuum, pressure, etc.), switches (e.g., variable speed, start, stop, etc.), seals, belts, pump (inc. base, bearing frame, motor, casing, bearings, seals), alarm system, valve position indicators, wear rings, impeller, shaft, check valve (inc. balls, disc), air chamber, cone valve, packing, gaskets, filters, injectors, spark plugs.

- For Process T (Electric Power) . . .

  generator, exciter, diesel, power generation control center, primary feeder breaker (manually or electrically activated), primary feeder transformer, transformer breaker, load bus, feeder breaker, load distribution panel or center, motor control center, magnetic starters (inc. contractor, coil, push buttons, selector switches, indicator lights, overload circuits), automatic control actuators (inc. floats, pressure switches, thermostats, micro switches, timers), disconnect switches, ampmeters, volt meters, watt-hour meters, elasped time meters, frequency meters, power factor meter, overvoltage relays, undervoltage relays, lighting transformers, emergency lighting system, transformer cases, electrical conduit and control boxes.

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- For Process U (Gas Power) . . .

  gas holder cover, meters, drip traps, moisture accumulator, valves (e.g., plug, pressure reducing, pressure relief, etc.), manometers, pressure gages, flame arrestors, primary gas receiver, gas booster (blower and motor, coupling, controls), secondary gas receiver, high and low pressure switches, gas filters, gas scrubbers, vacuum relief valves, waste gas burner explosion proof switch gear, rotary positive displacement, gas storage sphere.

- For Process V (Laboratory Control) . . .

  plumbing fixtures, gas cocks, storage units, cupboard units, fume-hood motors and blowers, desks, chairs, stools, calculator, typewriter, filing cabinets, laboratory equipment (e.g., clocks, de-ionizers, refrigerators, incubators, meters, ovens, furnaces, hot plates, analytical instruments, etc.)

  For Process W (Management/Supervisory) . . .

  furnishings (e.g., desks, chairs, cabinets, bookcases, etc.), equipment (e.g., typewriters, calculators, copy machines, dictation equipment, etc.).

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers parts lists, manufacturers catalogs, manufacturers operating instructions, design engineers specifications, manufacturers representatives card book, catalogs (electrical, engine, instrument, bearing, belt, chain, small part, nut and bolt, automotive, wastewater equipment), manufacturers listings (e.g., WPCF, etc.), telephone book, tool catalogs, laboratory chemical and supply catalogs, shop drawings, mail order catalogs.
2. Use of these types of information: equipment priority, vendor reputation, equipment name, size, serial numbers, model numbers, part numbers, purchase procedures, forms, price, tax, delivery and installation times, equipment inventory and I.D. cards, warranty terms.

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (Management/Supervisory)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 702:

S →	R
When given the task of ordering all consumable supplies needed in the operation of a specific plant for one year . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will actually prepare a list of consumable supplies usually required for the specific plant.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. This information: budget limits, budget categories (e.g., expendibles, consumables, etc.), deadlines (e.g., time limits, etc.).
2. These terms or descriptions (not already implied): purchase order, blanket purchase order, request to purchasing agent.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: manufacturers' manuals (e.g., catalogs, price lists, etc.), plant "as-built" prints including landscaping, equipment specifications, personnel roster (type, number), shift schedule, safety manual, major equipment list, plant contract specifications, union contracts, effluent standards or receiving water standards, materials price lists (quantity discounts).
2. Use of these types of information: present inventory, previous year's usage, projected change in number of personnel, projected change in plant, physical plant, lubrication schedules, monitoring requirements, record keeping requirements, annual plant budget, purchase procedure,

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Laboratory test requirements, training requirements, maintenance requirements, personnel clothing requirements, legal safety requirements, housekeeping requirements, bid specification forms, storage space available, materials delivery sechedule, materials delivery, handling costs, rates of materials usage, storage life of materials, wastestream influent rate.

3. Use of these types of supplies: light bulbs, packing, rags, clothing, oil lubrication, filters, welding supplies, office supplies, gardening, paint, janitorial, process chemicals (e.g., lime, chlorine, ferric chloride, polyelectrolytes, etc.), lab chemicals, safety supplies, fuels (e.g., gasoline, diesel oil, propane, etc.), automotive supplies (e.g., tires, batteries, etc.).

4. Using these tables, graphs, nomographs, and/or performing these calculations: cost per unit comparisions, calculator cost on larger purchase versus storage costs, usage per unit (person, million gallon, hours of operation, etc.), load limits storage space.

5. Essential use of these terms (not already implied): running inventory, cost analysis, responsible bidder, competitive bid, lowest and most reasonable bid.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

703 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (Management/Supervisory)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 703:

S →	R
When given the task of preparing the daily and monthly reports of a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will actually prepare the reports.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. This information: budget limits, budget categories (e.g., expendibles, consumables, etc.), deadlines (e.g., time limits, etc.).

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: standard report forms, plant specifications, shift schedules, plant as-built plans, effluent standards or receiving water standards, plant design specifications, equipment specifications.
2. Use of these types of information: monitoring requirements, required reports, laboratory analysis results, personal diary, maintenance records, power consumption, complete plant records (e.g., flow data, poundage, etc.), hourmeter readings, timekeeping records, who to report to - use of report, changes (e.g., personnel, training, operational procedure, equipment, etc.), plant modifications, purchasing methods, machinery records, personnel records, consumable materials inventories, utility billings, operator log sheets, timekeeping records.
3. Consideration of these points: material costs and purchases, personnel performance (problems, excellence), machinery performance (problems, excellence), unit efficiencies (problems, excellence), maintenance costs, operating costs, loadings on operational units.

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4. Using these tables, graphs, nomographs, and/or performing these calculations: unit and plant loading rates and efficiences (e.g., grit, primary, secondary, tertiary, digestors, incinerators, etc.), effluent load to receiving waters, unit costs, personnel costs, per cent of design expectations.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

704 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W *(Management/Supervisory)*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 704:

S →	R
When given the task of preparing the annual operation/maintenance report for the current year for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed and using the reference tools will determine the specific data needed and will actually prepare the report.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. This information: budget limits, budget categories (e.g., expendibles, consumables, etc.), deadlines (e.g., time limits, etc.).

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant specifications, shift schedule, monthly reports, "as built" plans, report format.
2. Use of these types of information: personnel records, organizational chart, machinery records, operation log, laboratory reports, training results, safety records, complete plant records (e.g., flow data, poundage, etc.), hourmeter information, cost breakdowns (utilities, personnel, machinery, operations), capital expenditures, personal diary, unit operating problems and changes, training provided, personnel changes, total cost, salary schedules, number, type of personnel, maintenance requirements, maintenance procedure changes.
3. Consideration of these points: personnel efficiency (e.g., problems, excellency, etc.), unit efficiency (e.g., problems, excellency, etc.), machinery history (e.g., modifications, excessive repair records, etc.), total efficiency, effluent quality in relation to standards, unit and total loading, safety, training, timekeeping records.

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4. Using these tables, graphs, nomographs, and/or performing these calculations: cost/unit treated, cost/unit operation, cost/unit maintenance, unit loads (organic and hydraulic), unit efficiencies, effluent pounds to receiving waters, per cent of design expectations, chronological changes in loading (e.g., hydraulic, solids, BOD, etc.).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

705 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (Management/Supervisory)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 705:

S $\longrightarrow$	R
When given the task of preparing the projected annual operation/maintenance budget breakdown for the coming year for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will actually prepare the projected budget.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. This information: budget limits, budget categories (e.g., expendibles, consumables, etc.), deadlines (e.g., time limits, etc.).

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: equipment catalogues, plant specifications, plant "as-built" prints, budget guides, area and population growth production reports, ENR index reports, planning commission reports, annual operation/maintenance report, operation log, laboratory reports, recording charts, effluent standards or receiving water standards.
2. Use of these types of information: construction time schedules and details; variation in municipal usage; personnel changes (salaries, fringe benefits, training); supplies; replacement parts and machinery; reliability, utility, chemicals, and housekeeping requirements; purchase request support data; budget restrictions (city imposed, population rate, etc.), unit design loading limits, monitoring requirements, work load data (numbers of pieces of equipment to operate and maintain and types, number of pump stations, miles of sewer, number of treatment units); number and types of personnel; current costs per unit; personnel changes; planned expansion details.

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3. Consideration of these points: local economy trends, union agreements, fringe benefits, changes in effluent requirements or receiving water requirements.
4. Using these tables, graphs, nomographs, and/or performing these calculations: percent increase or decrease in costs, comparative costing of alternates (i.e., cost of hauling and spreading sludge versus digestor operation), sums, costs/unit operation or maintenance.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

706 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 706:

S →	R
When given the task of hiring a new employee . . .	Trainee, from recall, will describe the categories (types) of information that he must use in the course of interviewing applicants for the job and will describe how information is relevant.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These categories or types of groups: operators, laboratory technicians, chemists, machinists, plumbers, painters, gardeners, mechanics, electricians, instrument technicians, maintenance and operating supervisors, laborers, draftsmen, secretary-receptionists, etc.
2. These terms or descriptions (not already implied): journeymen, apprentices, trainees, interns.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these types of information: aptitude tests and results, I.Q. (achievement) tests and results, application forms, job class specifications, nondiscriminatory requirements (Federal, state, city), ranking system, union contracts, medical history, civil service regulations.
2. Consideration of these points: personal appearance, skills and qualifications, previous experience, outside activities, aspirations, poise, conduct during interview, previous employment reference check.
3. Consideration of these reasons or causes: applicants normal apprehension at interview, relative importance of each item considered compared to position applied for, relation to existing crew, independence or dependence, previous salary and security.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

707 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (Management/Supervisory)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 707:

S →	R
When given the task of providing an orientation to a new employee . . .	Trainee, from recall, will describe the categories (types) of information that he must use in the conduct of a new-hire orientation and will describe how information is relevant.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These categories or types of groups: operators, laboratory technicians, chemists, machinists, mechanics, electricians, plumbers, painters, gardners, instrument technicians, maintenance and operating supervisors, laborers, draftsmen, secretary-receptionists.
2. These terms or descriptions (not already implied): journeymen, apprentices, trainees, interns.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these types of information: annual operation/maintenance reports, personnel pamphlets, flow diagrams, city maps, insurance brochures, workmen's compensation laws, plant descriptions, organization charts, plant map, promotion requirements, shift schedules, pay schedules, revenue schedules, fringe benefit schedules, vacation schedules, employees relative position, security, pay, pensions, hours of work, salary, organization history, financing, advancement opportunities, personal aspirations of employee.
2. Consideration of these reasons or causes: motivation, production, efficiency, prevention of personnel problems.
3. Taking these types of actions: introduce to supervisors and fellow employees, tour of plant.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

708 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 708:

S	R
When given the task of accomplishing nonterminal discipline of employees, and confronted with an actual justifiable cause, by name, verbal description, or other standard representation thereof . . .	Trainee will recognize the cause as such, and, from recall, will describe the reason(s) why the cause justifies employee discipline and will describe the action(s) relating directly to the actual discipline procedure.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These causes: insubordination, sleep on job, inefficiency, interpersonal agitation, lack of performance, excessive absence or tardiness, insufficient initiative, personal appearance, continual inaccuracies, lack of attention to safety, lack of attention to housekeeping, lack of courtesy to public, damage to or loss of plant property.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Consideration of these causes for employee's actions: basic attitude, lack of knowledge (incompetence, lack of training), personal problems, improper supervision, attitude toward plant, attitude toward self, relationship to co-workers.
2. Use of these types of information: performance evaluations, past history, original test performance, plant personnel rules and regulations, union agreements, civil service rules, personal documentation (e.g., time records, personal diary, etc.).
3. Consideration of these points: effect on other employees, effect on disciplined employee, effect on plant performance, effect on employee's future performance, privacy of employee (place and time of disciplinary action).

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4. Essential use of these terms (not already implied): oral reprimand, written reprimand, demotion, suspension, withholding of pay increases, reduction in pay, loss of vacation.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

709 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 709:

S →	R
When given the task of accomplishing employee dismissal, and confronted with an actual justifiable cause, by name, verbal description, or other standard representation thereof . . .	Trainee will recognize the cause as such, and, from recall, will describe the reason(s) why the cause justifies employee dismissal and will describe action(s) relating directly to the actual dismissal procedure.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These causes: intoxication on job, conviction of crime (e.g., felony, etc.), insubordination, continued poor performance (e.g., inefficiency, inaccuracy, etc.), safety infractions, equipment destruction, asleep on job, theft of plant property, lack of courtesy to public, lack of attendance, personal assault.
2. These terms or descriptions (not already implied): voluntary resignation.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Consideration of these causes for employee's actions: personal problems (e.g., family, psychiatric, health, economic, etc.), management failures, inadequate challenge or excessive demands, lack of training, lack of knowledge and skill.
2. Use of these types of information: personal diaries, rules and regulations, civil service procedures, union contracts, plant logs, plant policy statements, federal, state, and city laws.

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3. Consideration of these points: effect on other employees, effect on individual, effect on process operation or maintenance.
4. Essential use of these terms (not already implied): termination, fire.

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W *(Management/Supervisory)*

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 710:

S ⟶	R
When given the task of accomplishing personal and professional growth among employees, and confronted with an expressed need, by name, verbal description, or other standard representation thereof . . .	Trainee will recognize the need as such and, from recall, will name certain relevant "master" reference tools (e.g., resources catalog), and using the reference tools will locate the specific resource(s) relating to the fulfillment of the expressed need.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These categories or types of needs: training (e.g., maintenance, operation, process control, supervision, basic skills, basic education, etc.), formal education, variety of work experience, professional recognition, economic advancement, personal guidance.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: operational unit facility bulletins, local college and technical school bulletins, Federal and State training opportunities, lists of available literature, list of professional organizations, operator organization meetings, manufacturers schools available, correspondence school and course bulletins, in plant training schedules, salary schedule, plant library list, personnel roster of competencies and personal knowledge.
2. Consideration of these points: employee's aptitudes and progress to date, personal characteristics (e.g., employees time in class and service, employees previous schooling and family situation, development of leadership characteristics and the ability to follow, etc.).

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

711 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 711:

S	→ R
When given the task of developing staffing guides for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will specify the numbers and type of personnel required to operate the plant and will justify each employee in terms of certain characteristics of the plant as specified.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. This information: characteristics of plant (e.g., size, type, etc.).

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: WPCF Guidelines, Federal and State guidelines, plant specifications, plant as-built prints, engineers' recommendations, plant physical layout plan, effluent standards or receiving water standards.
2. Use of these types of information: proposed budget, number of process units, number and types of major components within each process unit, physical locations, policy of company on safety, housekeeping, reliability, preventive maintenance requirements, laboratory schedule, reliability requirements, staff required by a similar plant, workload per unit of operation, number of pieces of equipment, standards of reliability and efficiency, monitoring requirements, plant research and modification policy.

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3. Consideration of these points: budget limitations, units of standby equipment, degree of protection (e.g., alarms, emergency lubrication, etc.), degree of plant complexity.

4. Use of these types of personnel: machinists, electricians, plumbers and pipefitters, operating supervisors, journeyman operators, trainees, instrument technicians, chemists, laboratory technicians, secretary-receptionists, maintenance foremen or supervisors, painters, gardeners, laborers, tour guides.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

712 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (Management/Supervisory)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 712:

S →	R
When given the task of determining recommended operational changes in a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe *what*, if any, changes in day-to-day plant operation are indicated, *why* the changes are necessary, and *how* they should be implemented.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These requirements or specifications: effluent requirements and receiving water requirements, reliability requirements.
2. These terms or descriptions (not already implied): design performance, actual performance.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: effluent standards and receiving water standards, plant specification, as-built plans, plant operational manuals, operations manuals (New York, Texas, Washington, Federation), maintenance manuals, maintenance schedules, daily plant logs, maintenance service records, plant developed performance guides.
2. Use of these types of information: hourmeter readings, sampling procedures, power meter readings, monitoring recording charts, flowmeter readings, actual versus required performance, speed or rate of changes, location of changes, equipment in area of change, personnel in area of

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change, reliability requirements, equipment history, numbers and types of personnel, shift schedules, plant past performance information (e.g., laboratory data, efficiency, personnel), personnel changes, policy changes, cost, utility requirements, chemical usage, effluent quality requirements.

3. Consideration of these causes for indicated changes: personnel morale or changes, record keeping, influent quality or quantity, changing imposed standards, quality control schedule and analysis, experimentation.
4. Consideration of these process variations: process flow configurations, number of units in service, process loadings, recycling changes, upsets (e.g., digestor, activated sludge, etc.).
5. Essential use of these terms (not already implied): problem analysis (step by step analysis).

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (Management/Supervisory)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 713:

S →	R
When given the task of determining recommended capital improvements for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe what, if any, capital improvements are indicated, *why* the improvements are necessary, and *how much* the cost will be.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These requirements or specifications: effluent requirements or receiving water standards, design loadings and required performance of each unit and total plant, man hour distribution chart, equipment performance specifications.
2. This information: given a reason, cost and performance parameters.
3. These terms or descriptions (not already implied): expansion, efficiencies improvement, capital expenditure, depreciation.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant design specifications, plant as-built prints, manufacturers specifications and catalogues, area planning agency and population, growth predictions reports.
2. Use of these types of information: actual loading and performance of units, hourmeter readings, local business news, published industrial expansion plans, plant daily fluctuations (flow charts, personnel changes, equipment hours, numbers of units in service, costs of maintenance), capability, specification of existing equipment, plant logs and

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maintenance records, plant laboratory records, representative bid sheet, manufacturers bid prices, delivery schedules, availability of replacement parts.

3. Consideration of these points: delivery times, construction times, responsible bids, use of effluent, manhour savings or costs.
4. Consideration of these changes: effluent standard changes, operating and maintenance cost changes, policy changes, loss of efficiency, downtime, maintenance costs, operational costs, increased loading to receiving waters, change in quality of receiving waters, increases in overtime manhours, community growth, availability of new and more efficient tools, industrial growth.
5. Consideration of these process variations: influent quality or quantity, loading on all units, efficiencies (expected and existing), flow configuration changes, temperatures, industrial contributions, unit effectiveness.
6. Using these tables, graphs, nomographs, and/or performing these calculations: initial costs, manhours saved (maintenance operation) or increase, cost expected/unit comparison of existing with new costs plus any alternative costs or savings.
7. Essential use of these terms (not already implied): comparative cost analysis, capital depreciation.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

714 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 714:

S →	R
When given the task of describing (explaining) the operation of a specific plant to a group of lay persons . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data appropriate for the presentation; using the data trainee will actually prepare an outline for such a presentation.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These requirements or specifications: simplicity, clarity, understanding of audience.
2. These types of audiences: school children, ecology groups, political groups (e.g., League of Women Voters, etc.), elected or appointed officials (e.g., public or private, etc.), civic and service clubs (e.g., Lions' Club, Rotary Club, Chamber of Commerce, PTA, etc.), meetings or gatherings (e.g., city council, public hearings, finance committee, plant tours, news conferences, etc.), television or radio interviews.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: plant specifications, plant drawings, training manuals (plant), plant model, flow diagram, plant annual reports, plant budget records, laboratory reports, maintenance records, receiving water quality reports.
2. Use of these types of information: use of bar graphs, plant model, flow diagrams, slide projector, maps, graphs, illustrations, analogy descriptions, type of group, location of group, effect of group politically or

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in community action, facilities available, group attitude, personal appearance, poise, confidence, interest value, plant annual report, efficiencies, numbers of personnel, local sewage charges, capital costs.

3. Consideration of these points: lay persons' previous knowledge, use of effluent, costs, qualifications of plant personnel, area served, health benefits, esthetic and economic benefits (recreational, industrial, property, prosperity).

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 715:

S →	R
When given the task of responding to criticism of plant operation, and confronted with an actual complaint from private citizens and/or public officials regarding conditions both relevant and irrelevant to the operation of a wastewater plant, or a verbal description or other standard representation thereof . . .	Trainee will recognize the complaint as relevant or irrelevant, and, from recall, will describe the type of data appropriate to the complaint in question and will describe how (why) the complaint is relevant or irrelevant; using the data noted trainee will demonstrate an actual response to the complaint.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These categories or types of complaints: odor, esthetic, personnel behavior, health, safety, accidents, overflows, flooding, economic (e.g., sewer rates, etc.), economic depreciation of plant adjacent property, cave-ins.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these types of information: name, address, phone numbers (e.g., complaintant, related public officials, etc.), functions of other departments, utility maps, city maps, sewer maintenance records, previous complaint records, complaint report, plant operation reports, receiving water reports, sewerline prints, nature and details of complaint.
2. Consideration of these points: public relations of plant, contact with complaintant, correction of problem, previous complaints in same area or from same party, tact, rapid response.

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3. Consideration of these causes for complaint: lack of maintenance (sewer line cleaning, unit, equipment preventive maintenance), plugs, ventilation, failure of units (pumps, controls, power, drive units, odor control devices), personal attitude of plaintiff, design shortages, lack of control, improper operation, poor public relations.

4. Taking these types of actions: prevention of further occurences, follow-up of complaint from any city department including your own.

SPECIFIC BEHAVIOR
CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

716 - W

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 716:

S →	R
When given the task of convincing various groups as to the merits of necessary expansion of plant service . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will describe the specific data and arguments supporting the appropriation of funds needed for the expansion; using the data and arguments trainee will actually prepare press releases and speeches relating thereto.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These types of expansions: issuance of bonds, voter approval for mileage or rate increase.
2. These types of audiences: school children, ecology groups, political groups (e.g., League of Women Voters, etc.), elected or appointed officials (e.g., public or private, etc.), civic and service clubs (e.g., Lions' Club, Rotary Club, Chamber of Commerce, PTA, etc.), meetings or gatherings (e.g., city council, public hearings, finance committee, plant tours, news conferences, etc.), television or radio interviews.
3. These terms or descriptions (not already implied): revenue bonds, state and Federal grants, general obligation bonds.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these reference tools: local water survey reports, population growth reports, industrial expansion reports, health department reports, original plant design reports, plant specifications, plant prints, soil

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condition reports, planning commission reports, plant annual reports, (E.M.R. index), water quality standards, effluent standards or expected new standards or changes, engineer's preliminary report.

2. Use of these types of information: slides, graphs, (linear bar), maps, illustrations, handout reports, flow data, predictive graphs, plant performance data, news and report clippings, circle graphs, state and Federal standards reports and enforcement procedures, cost presentations, community health requirements, soil perk tests, sewer use rates, surcharges, plant efficiency, quality of effluent, changes in service boundaries, number of new households or industrial equivalents expected, cost of present operation, source of appropriations, interest rates, miles of existing sewer lines and cost/unit, lists of groups, members of council and local newspapers, sympathies and philosophies, local construction costs, rate of economic change.
3. Consideration of these points: accuracy, completeness, detail, (possible questions, clarity, audience characteristics, or antagonism), news media, group and council sympathies, interest, competing community concerns, public awareness, previous public relations in community.
4. Consideration of these reasons or causes: community growth, (domestic, industrial), water quality requirements, effluent uses, population growth, industrial growth, efficiency losses, standard changes, flow changes, tax or rate structure changes, new transportation facilities.

MANAGEMENT/SUPERVISORY skill and knowledge for MANAGEMENT/SUPERVISORY CMP UNIT

W (*Management/Supervisory*)

as it relates to the GENERAL CRITERION BEHAVIOR NUMBER 717:

S →	R
When given the task of promoting favorable public interest in wastewater plant operation, and confronted with an actual occasion of merit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the meritorious occasion as such and, from recall, will describe the most useful way in which appropriate persons can be made aware of the occasion to the benefit of the trainee specifically and the industry generally, and will describe the specific measures to be taken; trainee will actually perform the procedure.

STIMULUS DETAIL: For specific CMP PROCESS W, the general stimulus (S) above implies appropriate representation of at least the following . . .

1. These types of meritorious occasions: reception of awards, professional service by staff, innovation of operation and maintenance procedures, increase in certification level of personnel, maintenance of efficiency under adverse conditions, bravery and quick thinking in handling dangerous situations or saving of life, superior safety record, retention of highly skilled and efficient employees, extra effort in public relations, disaster prevention, aid to others, any performance above and beyond the call of duty, general superior performance.
2. These terms or descriptions (not already implied): extrameritorious.

RESPONSE DETAIL: For specific CMP PROCESS W, the general response (R) above implies appropriate representation of at least the following . . .

1. Use of these types of data: oral, written, pictorial, token.
2. Use of these types of information: personnel records, time record, plant reports, pictures of area of action, other witness statements, observation of site, state reports, written statements, personal

Continued on following page

Continued from previous page, Specific Behavior 717-W

knowledge of person (goals, attributes, weak points), details of meritorious acts or act (where, when, what, who), job specifications.

3. Consideration of these points: past performance, where the act(s) performed, when performed (timing), capabilities of company reward system, publication facilities and association contacts or memberships, local newspaper, radio or television interest, past training.
4. Essential use of these terms (not already implied): salary, promotion, transfer, public acclaim, status, security.

APPENDIX

COMPOSITE MODEL PLANT

-CMP-

CONTENTS

PROCESSES CHART 563

SPECIFIC PROCESS UNITS

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PROCESSES CHART

F	TRICKLING FILTRATION
R	FLOW MEASUREMENT
L	SECOND STAGE DIGESTION
C	SCREENING AND GRINDING
T	ELECTRIC POWER
G	AERATION
O	SLUDGE DEWATERING
A	COLLECTION
J	THICKENING
U	GAS POWER
N	POST-CHLORINATION
E	PRIMARY SEDIMENTATION
Q	EFFLUENT DISPOSAL
K	FIRST STAGE DIGESTION
V	LABORATORY CONTROL
B	PRECHLORINATION
H	SECONDARY SEDIMENTATION
P	SOLIDS DISPOSAL
W	MANAGEMENT/ SUPERVISORY
D	GRIT REMOVAL
M	SLUDGE CONDITIONING
S	PUMPING AND PIPING
I	POND STABILIZATION

A. COLLECTION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Combined system with industrial waste

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Sanitary system with industrial waste

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Combined system without industrial waste

31. Sanitary system without industrial waste

32. Storm system

33. Industrial system

B. PRECHLORINATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Vacuum chlorinator with automatic feed to pipe, pneumatic control, and electric evaporator

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Vacuum chlorinator with automatic feed to pipe, electrical control, and electrical evaporator

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Solution feed chlorinator with discharge to pipe

31. Solution feed chlorinator with discharge to channel

32. Solution feed chlorinator with discharge to basin

33. Vacuum chlorinator with electrical evaporator and discharge to channel

34. Vacuum chlorinator with electrical evaporator and discharge to basin

35. Chlorinator with only manual control

C. SCREENING AND GRINDING

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Mechanically cleaned bubbler control unit with grinder

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Mechanically cleaned electrode control unit with grinder

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Mechanically cleaned timer control unit without grinder
31. Mechanically cleaned electrode control unit without grinder
32. Mechanically cleaned float control unit without grinder
33. Mechanically cleaned manual control unit without grinder
34. Mechanically cleaned bubbler control unit without grinder
35. Mechanically cleaned timer control unit with grinder
36. Mechanically cleaned float control unit with grinder

Continued on following page

Continued from previous page (Screening and Grinding)

37. Mechanically cleaned manual control unit with grinder
38. Comminution unit
39. Fine screen unit
40. Disc screen unit
41. Band screen unit
42. Drum screen unit
43. Osciliating screen unit
44. Hand cleaned rack unit
45. Wire wedge screen unit

D. GRIT REMOVAL

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Aerated unit with bucket elevator

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Aerated unit with screw conveyor

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Aerated unit with air lift
31. Aerated unit with clam shovel
32. Velocity control unit with screw conveyor
33. Velocity control unit with bucket elevator
34. Velocity control unit with clam shovel
35. Surface overflow unit with screw conveyor
36. Surface overflow unit with bucket elevator
37. Surface overflow unit with rake
38. Cyclone unit

E. PRIMARY SEDIMENTATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Rectangular unit with telescopic valve draw off, density meter time clock, and trough with scraper

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Circular unit with telescopic valve draw off, density meter time clock, and trough with scraper

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Rectangular unit with sight glass, direct draw off, and trough with scraper
31. Rectangular unit with sight glass, direct draw off, and helical skimmer
32. Circular unit with sight glass, trough with scraper, and direct sludge draw off
33. Circular unit with sight glass, trough with scraper, and telescopic valve draw off
34. Rectangular unit with helical skimmer and density meter time clock
35. Rectangular unit with helical skimmer and telescopic valve draw off

Continued on following page

Continued from previous page (Primary Sedimentation)

36. Square unit
37. Imhoff tank
38. Septic tank
39. Lagoon
40. Two story mechanical unit
41. Evacuator unit

F. TRICKLING FILTRATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Rotary distributor, standard rate unit with dosing tank

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Rotary distributor, high rate unit

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Rotary distributor, roughing unit

31. Fixed nozzle unit

G. AERATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Diffused air unit with swing type diffuser producing fine bubbles

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Mechanical aeration unit with turbine and sparger

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Diffused air unit with fixed type diffuser producing fine bubbles
31. Diffused air unit with swing type diffuser producing large bubbles
32. Diffused air unit with fixed type diffuser producing large bubbles
33. Flat plate diffuser
34. Mechanical aeration unit with brush
35. Mechanical aeration unit with propeller
36. Ejector nozzle aeration unit
37. Ejector aeration unit
38. Oxygen aeration unit

H. SECONDARY SEDIMENTATION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Circular, peripheral feed unit with suction

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Circular, center feed unit with suction

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Rectangular unit
31. Circular, center feed unit with scraper
32. Circular, peripheral feed unit with scraper
33. Tube settler unit
34. Square unit

I. POND STABILIZATION

PRINCIPAL *UNIT(S) are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Aerobic pond

OTHER *UNIT(S) are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE *UNIT(S) are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Facultative pond

NONALTERNATE *UNIT(S) are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Anaerobic pond

J. THICKENING

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Floatation unit with air

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Floatation unit with vacuum

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Stirring and settling unit

31. Centrifuge unit

K. FIRST STAGE DIGESTION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Fixed cover, gas recirculation unit with external heat exchanger

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Floating cover, gas recirculation unit with external heat exchanger

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Aerobic digester unit
31. Fixed cover unit with turbo mix
32. Fixed cover unit with hot water coil heat
33. Septic tank
34. Imhoff tank

L. SECOND STAGE DIGESTION

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Floating cover unit with gas storage

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Fixed cover unit

NONALTERNATE UNIT(S) *are "other" unit(s) that can* not *be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Aerobic digester unit

M. SLUDGE CONDITIONING

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Chemical conditioning unit with counter-current elutriation

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. None

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Multi-stage elutriation unit

31. Single stage elutriation unit

32. Unit using Laboon process

33. Unit using Heymann process

N. POSTCHLORINATION

PRINCIPAL *UNIT(S) are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Vacuum chlorinator with automatic feed to pipe and close loop pneumatic control

OTHER *UNIT(S) are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE *UNIT(S) are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Vacuum chlorinator with automatic feed to pipe and close loop electrical control

NONALTERNATE *UNIT(S) are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Solution feed chlorinator with discharge to pipe
31. Solution feed chlorinator with discharge to channel
32. Solution feed chlorinator with discharge to basin
33. Vacuum chlorinator with discharge to channel
34. Vacuum chlorinator with discharge to basin
35. Chlorinator with only manual control

O. SLUDGE DEWATERING

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Vacuum filter unit with cloth

11. Continuous feed centrifuge unit

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Vacuum filter unit with coil

21. None

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Drying beds

31. Sludge press unit

32. Sludge lagoon

P. SOLIDS DISPOSAL

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Multiple hearth incinerator unit

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Fluidized bed incinerator unit

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Burial

31. Soil conditioner

32. Water grate incinerator unit

33. Unit using Zimmerman process

Q. EFFLUENT DISPOSAL

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Direct reuse system

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. Underground disposal system

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. Dilution system
31. Irrigation system
32. Intermittent sand filter unit as used in tertiary treatment
33. Precipitation unit as used in tertiary treatment
34. Ion exchange unit as used in tertiary treatment
35. Adsorption unit as used in tertiary treatment
36. Ponds as used in tertiary treatment
37. Freezing unit as used in tertiary treatment
38. Nutrient removal unit as used in tertiary treatment

Continued on following page

Continued from previous page (Effluent Disposal)

39. Microscreen unit as used in tertiary treatment
40. Reverse osmosis unit as used in tertiary treatment
41. Electrodialysis unit as used in tertiary treatment
42. Pressure filter unit as used in tertiary treatment
43. Reaeration unit as used in tertiary treatment

R. FLOW MEASUREMENT

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. Centralized recording and totalizing system including Parshall flume, Venturi meter, magnetic flow meter, and rotameter

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. None

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. V notch weir unit

31. Rectangular weir unit

32. Proportional flow weir unit

33. Kennison nozzle unit

S. PUMPING AND PIPING

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. System with magnetically connected, pneumatically controlled, diesel driven, centrifugal pumps; speed reducer connected, electrically controlled, motor driven, positive displacement pumps; and the piping appropriate thereto

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. None

NONALTERNATE UNIT(S) *are "other" unit(s) that can* not *be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. System with air lift pump

31. System with screw lift pump

32. System with hand driven pump

33. System with water driven pump

34. System with air driven pump

35. System with pneumatic ejector pump electrode controlled

T. ELECTRIC POWER

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. System using delta transformers, generators, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. System using Y transformers, generators, electrical switch gear, automatic circuit actuators on motors, and telemetering with alarms

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. System using outside generated power with manually controlled circuit motor starters

U. GAS POWER

PRINCIPAL UNIT(S) *are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:*

10. System with internally produced gas with high pressure tanks and rotary positive displacement compressors

OTHER UNIT(S) *are those only indirectly represented in the curriculum for the subject process.*

ALTERNATE UNIT(S) *are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:*

20. System with internally produced gas with high pressure tanks and reciprocating compressors

NONALTERNATE UNIT(S) *are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:*

30. System with internally produced gas with gas holder covers and centrifugal blowers

31. System with externally produced gas

V. LABORATORY CONTROL

PRINCIPAL UNIT(S) are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:

The trainee will have access during training to a model laboratory facility, typical of a 5 mgd to 25 mgd plant, consisting of the following types of furnishings, equipment, and supplies . . .

10. Furnishings
    - a. cupboard units
    - b. sink cupboard unit with mixing faucet, polyethylene sink trap and stand pipe
    - c. gray colorlith tap and splashback for entire assembly with gas key hose cock and 2 electric outlet boxes
    - d. storage unit lockable, with adjustable shelves
    - e. fume-hood with motor and blower
    - f. desk, chairs, and stools
    - g. calculator
    - h. typewriter
    - i. filing cabinet
11. Equipment
    - a. clock, interval timer
    - b. de-ionizer
    - c. refrigerator, at least 10 ft^3
    - d. BOD incubator
    - e. water still
    - f. pH meter
    - g. balance, triple beam
    - h. balance, analytical
    - i. desiccator
    - j. drying oven
    - k. muffle furnace
    - l. pressure vacuum pump
    - m. bunsen burner
    - n. hot plate
    - o. water bath
    - p. colorimeter-spectrophotometer
    - q. digestion apparatus, Kjeldahl
    - r. distillation apparatus, Kjeldahl
    - s. gas analysis apparatus (CO_2)
    - t. sewage sampler
    - u. chlorine colorimetric equipment
    - v. condenser
    - w. microscope and light
    - x. sterilizer for sample bottles
    - y. incubator 37°C water bath

Continued on following page

Continued from previous page (Laboratory Control)

12. Supplies
    - a. general
        - (1) apron
        - (2) brushes
        - (3) funnels
        - (4) spatula
        - (5) wax pencils
        - (6) lubricants
        - (7) glassware cleaner
        - (8) face shield
        - (9) neoprene gloves
        - (10) graph paper
    - b. analytical
        - (1) sample bottles
        - (2) BOD bottles
        - (3) wash bottles
        - (4) dropping bottles
        - (5) test tube
        - (6) nessler tube
        - (7) Erlenmeyer flask
        - (8) volumetric flask
        - (9) filtering flask
        - (10) Kjeldahl flask
        - (11) round bottom flask
        - (12) separatory funnel
        - (13) Buchner funnel
        - (14) funnel support
        - (15) buret and buret caps
        - (16) buret clamp
        - (17) buret support
        - (18) Gooch crucible
        - (19) crucible holder
        - (20) crucible tongs
        - (21) pipets
        - (22) safety pipet filler
        - (23) beakers
        - (24) graduated cylinders
        - (25) evaporating dish and petri/dishes
        - (26) opal glass plate
        - (27) glass fibre filter disc
        - (28) glass beads
        - (29) rubber stoppers
        - (30) rubber tubing
        - (31) utility clamps
        - (32) tripod
        - (33) filter paper
        - (34) thermometer
        - (35) media for bacteriological analysis
    - c. chemical
        - (1) methylene blue solution
        - (2) buffer solution
        - (3) phenolphthlein indicator solution
        - (4) thymol blue indicator solution
        - (5) methyl orange indicator solution
        - (6) manganous sulfate solution

Continued on following page

Continued from previous page (Laboratory Control)

(7) sodium thiosulfate solution
(8) starch solution
(9) calcium chloride solution
(10) ferric chloride solution
(11) magnesium sulfate solution
(12) phosphate buffer
(13) ferrous ammonium sulfate solution
(14) potassium dichromate solution
(15) sulfuric acid-silver sulfate solution
(16) ammonium chloride solution
(17) nessler reagent solution
(18) Rochelle salt solution
(19) zinc sulfate solution
(20) sodium arsenite solution
(21) standard nitrate solution
(22) boric acid solution
(23) sodium hydroxide-sodium thiosulfate solution
(24) sulfuric acid-mercuric sulfate potassium sulfate solution
(25) N-Butanol reagent
(26) chloroform reagent
(27) alkaline iodide azide reagent
(28) potassium iodide reagent
(29) arsenite reagent
(30) sodium sulfate reagent
(31) brucine-sulfanilic acid reagent
(32) mercuric sulfate reagent
(33) sodium hydroxide
(34) calcium chloride
(35) silicic acid
(36) sulfuric acid
(37) ferrion
(38) potassium chromate
(39) silver nitrate
(40) zonite

OTHER UNIT(S) are those only indirectly represented in the curriculum for the subject process.

ALTERNATE UNIT(S) are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:

20. None
21. None
22. None

Continued on following page

Continued from previous page (Laboratory Control)

NONALTERNATE UNIT(S) are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:

30. None

W. MANAGEMENT/SUPERVISORY

PRINCIPAL UNIT(S) are those to be directly represented in the curriculum for the subject process and are designated by the following descriptions:

The trainee will have access during training to a model office of a typical 5 mgd to 25 mgd facility, requiring the services of, and serving the purpose of, a superintendent, assistant superintendent, three foremen, and a secretary. The office will, in design and appointment, be representative of a typical plant office consisting of the following types of furnishings, equipment, and supplies . . .

10. Furnishings
    a. desks
    b. chairs
    c. file cabinets containing shop drawings, daily, monthly, annual reports, bid sheets, memos, inventory, personnel records
    d. blue-print cabinet (with sample prints) and table
    e. bookcase containing supply catalogs, reference materials, and technical journals
11. Equipment
    a. typewriter
    b. calculator
    c. copy machine
    d. duplicating machine
    e. dictation equipment
12. Supplies
    a. standard (as found in any office)
    b. special (serving needs of wastewater plant--e.g., forms, log books, slide rule, etc.)

OTHER UNIT(S) are those only indirectly represented in the curriculum for the subject process.

ALTERNATE UNIT(S) are "other" unit(s) that may be used in lieu of the "principal" unit(s) when the latter are not available; the "alternate" unit(s) are designated by the following descriptions:

20. None
21. None
22. None

Continued on following page

Continued from previous page (Management/Supervisory)

NONALTERNATE UNIT(S) are "other" unit(s) that can not be used in lieu of the "principal" unit(s) when the latter are not available; the "nonalternate" unit(s) are designated by the following descriptions:

30. None

CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

GENERAL CRITERION BEHAVIORS

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Management/Supervisory Procedures (701 - 717) 607

GENERAL CRITERION BEHAVIORS for . . .

NORMAL OPERATION PROCEDURES: 101 and 102

101

S	R
When given the task of performing the *normal* operation procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; from recall, trainee will actually perform the procedure.

102

S	R
When considering the conduct of an actual specific *normal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

GENERAL CRITERION BEHAVIORS for . . .

ABNORMAL OPERATION PROCEDURES: 201 and 202

201

S	R
When given the task of performing the *abnormal* operation procedures, and confronted with actual indications of an abnormal condition of the wastestream, or a verbal description or other standard representation thereof . . .	Trainee will recognize the abnormality as such, and, from recall, will identify it as to probable cause and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term corrective (operationally and mechanically related) measures; using the reference tools trainee will actually perform the indicated procedure.

202

S	R
When considering the conduct of an actual, specific *abnormal* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

GENERAL CRITERION BEHAVIORS for . . .

PREVENTIVE MAINTENANCE PROCEDURES: 301 and 302

301

S	R
When given the task of performing the *preventive* maintenance procedures, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the routine he will follow and its frequency, the conditions he will look for, the actions he will take, and for certain actions the "whys" that are most relevant; using the reference tools trainee will actually perform the procedure.

302

S	R
When considering the conduct of an actual specific *preventive* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

GENERAL CRITERION BEHAVIORS for . . .

CORRECTIVE MAINTENANCE PROCEDURES: 401 - 403

401

S	R
When given the task of performing the *corrective* maintenance procedures, and confronted with actual, mechanical indications of a malfunction of a process unit or component within the unit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the mechanical malfunction as such and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the immediate and/or long term operational adjustments that may be necessary, will name the most probable component(s) needing repair or replacement, if more than one probable cause of malfunction, will list in order of probability from highest to lowest, if component(s) need repair, will briefly describe the nature of the repair; using the reference tools trainee will actually perform the indicated procedure.

402

S	R
When considering the conduct of some relevant procedure, and confronted with a common name of a *significant* component of a related process unit, or a functional or physical description or other standard representation thereof . . .	Trainee, from recall, will point to the component on the actual process unit or an appropriate facsimile, and will recall the name(s) of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe "when" the component is operative, "what" it does, and "how" and "why" it functions as it does within the unit.

Continued on following page

CORRECTIVE MAINTENANCE PROCEDURES: Continued

403

S	R
When considering the conduct of an actual specific *corrective* procedure, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the procedure related directly to employee safety, including how (why) they protect the employee.

GENERAL CRITERION BEHAVIORS for . . .

LABORATORY CONTROL PROCEDURES: 501 - 504

501 →

S	R
When given the task of performing the laboratory control procedures, and confronted with the need to conduct any common laboratory analysis, identified by name, functional description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., guides) available for use in the conduct of the tests, and using the reference tools will describe the conduct of sampling and analysis and the facilities, equipment, and supplies involved; using the reference tools, trainee will actually perform the sampling and analysis in accordance with the most current recommendations as reported by the relevant professional organization.

502 →

S	R
When given the task of determining if a specific plant meets standard requirements and specifications related to quality of wastestream and receiving water . . .	Trainee will recall the name(s) of relevant reference tools needed, and using the reference tools will name the standard analyses and the frequency of these analyses to determine the operational efficiency of specific units or combinations of units.

Continued on following page

LABORATORY CONTROL PROCEDURES: Continued

503

S	R
Given the task of determining if the results of the laboratory analyses in a specific plant meet standard requirements and specifications related to quality of wastestream and receiving water . . .	Trainee will recall the name(s) of relevant reference tools needed, and using the reference tools will specify if results fall within an acceptable range of values.

504

S	R
When considering the conduct of a specific laboratory analysis, or when confronted with it by name, functional description, or other standard representation thereof . . .	Trainee, from recall, will describe and/or demonstrate those aspects of the analysis related directly to employee safety, including how (why) they protect the employee.

GENERAL CRITERION BEHAVIORS for . . .

SYSTEMS INTERACTION PROCEDURES: 601 - 607

601

S	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with the actual condition(s) of the wastewater entering or of the wastestream within the plant, or a verbal description or other standard representation thereof . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the process unit(s) directly involved in dealing with the condition(s) and will describe how the unit(s) deal with the specified condition(s).

602

S	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with an actual common industrial waste, or a common name, verbal description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe the possible effect(s) of the waste (if present in plant's influent) on the plant's treatment process and on the receiving stream.

603

S	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with an actual process unit, or a common name, functional or physical description, or other standard representation thereof . . .	Trainee, from recall, will describe the purpose of the process unit within a treatment plant and how its function relates to other units within the plant.

Continued on following page

SYSTEMS INTERACTION PROCEDURES: Continued

604

S	R
When given the task of planning the laboratory control procedures of a specific plant . . .	Trainee will recall the name(s) of relevant reference tools needed, and using the reference tools will identify appropriate sampling locations and will describe the significance to the plant as a whole of each sampling location.

605

S	R
When given the task of making preliminary proposals regarding the wastewater treatment needs of a specific community area . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will name the most probable processes needed in a treatment plant to meet the conditions indicated and will prepare a simple line diagram showing the relationship of the named processes.

Continued on following page

SYSTEMS INTERACTION PROCEDURES: Continued

606

S	R
When given the task of planning the overall operation of a specific plant for a certain period of time, and confronted with an actual *major* disaster (condition) that is in either a possible, pending, or occurred status, or a verbal description or other standard representation thereof . . .	Trainee will recognize the disaster as such and, from recall, will identify the probable related operational disruptions, plant damages, and threats to health, and will recall the names of relevant reference tools (e.g., guides) available for use, and using the reference tools will describe the indicated immediate and/or long term preventive and/or corrective measures; using the reference tools trainee will actually perform the indicated procedure.

607

S	R
When given the task of relating optional process units, and confronted with a common name, physical or functional description, or other standard representation of a process unit, or a component thereof, designated "OTHER" in the CMP . . .	Trainee, from recall, will identify by common name, physical or functional description, or other standard representation thereof, the "PRINCIPAL" process unit(s) or unit component(s) to which the "OTHER" unit or unit component relates, and will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe how the units or unit components are similar and/or different functionally and/or mechanically.

GENERAL CRITERION BEHAVIORS for . . .

MANAGEMENT/SUPERVISORY PROCEDURES: 701 - 717

701

S	R
When given the task of placing orders for service or parts, and confronted with an actual process unit, or unit component, by common name, functional or physical description, or other standard representation thereof . . .	Trainee will recall the name(s) of relevant reference tools (e.g., catalogs) available for use and using the reference tools will actually prepare a purchase or service order form listing all relevant information.

702

S	R
When given the task of ordering all consumable supplies needed in the operation of a specific plant for one year . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will actually prepare a list of consumable supplies usually required for the specific plant.

703

S	R
When given the task of preparing the daily and monthly reports of a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will actually prepare the reports.

Continued on following page

MANAGEMENT/SUPERVISORY PROCEDURES: Continued

704

S	R
When given the task of preparing the annual operation/maintenance report for the current year for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed and using the reference tools will determine the specific data needed and will actually prepare the report.

705

S	R
When given the task of preparing the projected annual operation/maintenance budget breakdown for the coming year for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will actually prepare the projected budget.

706

S	R
When given the task of hiring a new employee . . .	Trainee, from recall, will describe the categories (types) of information that he must use in the course of interviewing applicants for the job and will describe how information is relevant.

Continued on following page

MANAGEMENT/SUPERVISORY PROCEDURES: Continued

707

S	R
When given the task of providing an orientation to a new employee . . .	Trainee, from recall, will describe the categories (types) of information that he must use in the conduct of a new-hire orientation and will describe how information is relevant.

708

S	R
When given the task of accomplishing nonterminal discipline of employees, and confronted with an actual justifiable cause, by name, verbal description, or other standard representation thereof . . .	Trainee will recognize the cause as such, and, from recall, will describe the reason(s) why the cause justifies employee discipline and will describe the action(s) relating directly to the actual discipline procedure.

709

S	R
When given the task of accomplishing employee dismissal, and confronted with an actual justifiable cause, by name, verbal description, or other standard representation thereof . . .	Trainee will recognize the cause as such, and, from recall, will describe the reason(s) why the cause justifies employee dismissal and will describe action(s) relating directly to the actual dismissal procedure.

Continued on following page

MANAGEMENT/SUPERVISORY PROCEDURES: Continued

710

S	R
When given the task of accomplishing personal and professional growth among employees, and confronted with an expressed need, by name, verbal descriptipn, or other standard representation thereof . . .	Trainee will recognize the need as such and, from recall, will name certain relevant "master" reference tools (e.g., resources catalog), and using the reference tools will locate the specific resource(s) relating to the fulfillment of the expressed need.

711

S	R
When given the task of developing staffing guides for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will specify the numbers and type of personnel required to operate the plant and will justify each employee in terms of certain characteristics of the plant as specified.

Continued on following page

MANAGEMENT/SUPERVISORY PROCEDURES: Continued

712

S	R
When given the task of determining recommended operational changes in a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe *what*, if any, changes in day-to-day plant operation are indicated, *why* the changes are necessary, and *how* they should be implemented.

713

S	R
When given the task of determining recommended capital improvements for a specific plant . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data needed and will describe *what*, if any, capital improvements are indicated, *why* the improvements are necessary, and *how much* the cost will be.

714

S	R
When given the task of describing (explaining) the operation of a specific plant to a group of lay persons . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will determine the specific data appropriate for the presentation; using the data trainee will actually prepare an outline for such a presentation.

Continued on following page

MANAGEMENT/SUPERVISORY PROCEDURES: Continued

715

S	R
When given the task of responding to criticism of plant operation, and confronted with an actual complaint from private citizens and/or public officials regarding conditions both relevant and irrelevant to the operation of a wastewater plant, or a verbal description or other standard representation thereof . . .	Trainee will recognize the complaint as relevant or irrelevant, and, from recall, will describe the type of data appropriate to the complaint in question and will describe how (why) the complaint is relevant or irrelevant; using the data noted trainee will demonstrate an actual response to the complaint.

716

S	R
When given the task of convincing various groups as to the merits of necessary expansion of plant service . . .	Trainee will recall the name(s) of relevant types of data and reference tools needed, and using the reference tools will describe the specific data and arguments supporting the appropriation of funds needed for the expansion; using the data and arguments trainee will actually prepare press releases and speeches relating thereto.

Continued on following page

MANAGEMENT/SUPERVISORY PROCEDURES: Continued

$\xrightarrow{717}$

S	R
When given the task of promoting favorable public interest in wastewater plant operation, and confronted with an actual occasion of merit, or a verbal description or other standard representation thereof . . .	Trainee will recognize the meritorious occasion as such and, from recall, will describe the most useful way in which appropriate persons can be made aware of the occasion to the benefit of the trainee specifically and the industry generally, and will describe the specific measures to be taken; trainee will actually perform the procedure.

CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

TRAINEE CHARACTERISTICS

TRAINEE CHARACTERISTICS
TWO YEAR POST HIGH SCHOOL WASTEWATER TECHNOLOGY TRAINING PROGRAM

PURPOSE

This documentation provides general guidance to the training institution on the recruitment and placement of trainees. The information provided relates to the expected characteristics of the trainee when entering and when graduating from the training program.

TRAINEE CHARACTERISTICS WHEN ENTERING PROGRAM

It is beyond the scope of the present effort to offer objectively qualified characteristics (e.g., a characteristic as indicated by a certain score on a specified testing instrument). However, it is expected that the training institution will develop (in cooperation with the funding agency or its representative) and use such an objective approach in its trainee recruitment and selection procedure. Standards of acceptance for all categories will be determined by the institution in consultation with the Central Coordinating Committee. The present document will offer only general guidance as to the types of factors to be used in trainee selection. Selected trainees will be represented in two groups.

1. Principal Trainee Group

   The essential characteristic of this group is that the trainees be recent high school graduates or have attained equivalent academic accomplishment through remedial work and/or testing (e.g., GED). Trainees of this group must have no water or wastewater treatment work experience. Trainees of this group will comprise at least two-thirds of the recruits for a given training class.

   Trainees should be further screened and selected with respect to the following:

   a. Formal education. To the extent that it can be objectively determined, the trainee's academic accomplishment should be representative of at least the middle third of the national population.

b. Aptitudes. A model profile of "ideal" trainee aptitudes should be determined. Using standardized tests and their normative data, a trainee's specific aptitude profile will be developed and compared to the model profile. Standards of acceptance should be determined and applied with respect to at least the following:

(1) General intelligence (achievement)

(2) Verbal skill

(3) Numerical skill

(4) Clerical skill

(5) Spatial perception

(6) Form perception

(7) Motor coordination

(8) Finger dexterity

(9) Manual dexterity

(10) Eye-hand-foot coordination

(11) Color discrimination

(12) Visual acuity

(13) Auditory acuity

(14) Olfactory acuity

c. Interest. A model profile of "ideal" tainee interest should be determined. Using pre-entrance orientation (including plant visitation), personal counseling, and standardized tests and their normative data, a trainee's specific interest profile will be developed and compared to the model profile. Standards of acceptance should be determined and applied with respect to at least the following interest categories:

(1) The environment

(2) The natural and physical sciences

(3) Mechanical technology

(4) Professional or paraprofessional employment

(5) Public service opportunity

(6) Wastewater treatment employment

d. Temperament. A model profile of "ideal" trainee temperament should be determined. Using pre-entrance orientation, personal counseling, and standardized tests and their normative data, a trainee's specific temperament profile will be developed and compared to the model profile. Standards of acceptance should be determined and applied with respect to the following conditions:

(1) Working at all levels of supervision

(2) Being appropriately responsive in the face of political, regulatory and public scrutiny and criticism

(3) Maintenance of quality performance in the face of highly repetitive, routine procedures

(4) Acceptance of the responsibility for the safety and welfare of one's self, one's fellow workers, and the public.

e. Physical capability. A model profile of "ideal" trainee physical capacity should be determined. Using medical examinations and standardized tests and their normative data, a trainee's specific physical capacity profile will be developed and compared to the model profile. Standards of acceptance should be determined and applied with respect to at least the following activities:

(1) Climbing
(2) Balancing
(3) Stooping
(4) Kneeling
(5) Crouching
(6) Reaching
(7) Handling
(8) Fingering
(9) Lifting

f. Physical sensitivity. A model profile of "ideal" trainee physical tolerance should be determined. Using medical examinations, personal counseling, and standardized tests and their normative data, a trainee's specific physical tolerance profile will be developed and compared to the model profile. Standards of acceptance should be determined and applied with respect to the following conditions:

(1) Year-round inside work
(2) Year-round outside work
(3) Temperature changes
(4) Risk of bodily injury
(5) Fumes
(6) Odors
(7) Dust
(8) Toxic conditions

In the course of trainee selection proceuures involving "a" through "f" above, it will sometimes become obvious that the proposed trainee is capable of a much higher level of training and employment opportunity than that offered by the subject program. In such cases the trainee should be counseled and provided assistance, if he wishes it, in seeking opportunities in the water quality field that better fit his capabilities. Applicants whose capabilities fall within the ideal range of capabilities should be given priority for admittance into the program.

2. Alternative Trainee Group

   Trainees of this group could comprise from one-fifth to one-third of the recruits for a given training class. Trainees of this group will be representative of the following:

   a. Educationally deficient. If an applicant meets all conditions in "1" above *except* those relating directly or indirectly to formal education ("a" and some of "b"), he may be accepted into the program if he is willing to undertake remedial, basic education to be provided or arranged by the selected training institution. All remedial work should be satisfactorily completed *before* the trainee begins the regular program. Therefore, it will be necessary to recruit trainees in this category well in advance of the regular program in which they will participate.

   b. Experienced wastewater treatment system employees. If an applicant meets all conditions as stated in "1" or "2a" above except the "must have no water or wastewater treatment work experience" requirement and has at least one year of acceptable (employer-rated) experience in a wastewater treatment system, he may be accepted into the program.

TRAINEE CHARACTERISTICS WHEN GRADUATING FROM THE PROGRAM

The information to follow is offered to provide the training institution a rather general indication of the desired capabilities of the trainee when he graduates from the subject training program. This information should be used to help the institution devise its trainee placement program.

1. Skill and Knowledge Possessed by Program Graduate

   a. General skill and knowledge. The program graduate will be expected to have hands-on skill* and knowledge* with respect to certain *specific* functional procedures and process units* representative of those in wastewater treatment plants. He will be able to relate, at least verbally*, other process units similar in form and function to the *specific* units. The program graduate will be able, with confidence and relative ease, to adapt the *specific* skill and knowledge acquired expressly through the training program to the many plants and processes not covered directly in the training program. The *specific* skill and knowledge acquired will relate to procedures in the areas of "normal operations"*, "abnormal operations"*, "preventive maintenance"*, "corrective maintenance"*, "laboratory control"*, "systems interaction"*, and "management/supervisory"*.

---

* Refer to the Glossary (page 35) for the indicated words.

b. Specific skill and knowledge. The *Curriculum Guidelines* as represented in *Volume II* indicates the *specific* skill and knowledge (behavior*) to be acquired by the trainee and is to be the basis for the training programs provided by the selected institutions. However, a reading of the "General Criterion Behaviors"* (refer to *Volume II*) is recommended at this time to provide a quick view of the *specific* skill and knowledge implied by the *Curriculum Guidelines*.

2. Positions for Which the Program Graduate is Prepared

a. General positions. Graduates should be regarded as technologists and paraprofessionals. This implies competence as a technician (involving hands-on level of application) with the ability to relate performance of the most basic procedure to the overall mission of the plant and to other procedures.

When performing those procedures of "normal operation", "abnormal operation", "preventive maintenance", "corrective maintenance", or "laboratory control", the program graduate will require varying degrees of supervision during his first weeks on the job or until such time as he is acquainted with the unique character of the plant and its operation. For example: to make a suspended solids determination on the mixed liquor, the trainee should need little or no supervision; however, to determine if the addition of lime to a stuck digester is necessary, he should be supervised more closely. In any case, the supervision required should be only occasional and brief. When performing the "management/supervisory" and "systems interaction" procedures, the trainee will require appreciably more supervision initially but should acquire the necessary competence and confidence much more quickly than is generally the case in on-the-job development. In fact, for all procedures the graduate should require no extensive in-depth on-the-job training after a brief initial orientation to his employment, and the amount of technical supervision needed should decline rapidly and remain minimal.

b. Specific positions. In most cases, the program graduate should enter employment as an "intern" preparing for rapid advancement to one of three positions; in some cases, the entry position may be that of sole employee. The actual position will depend on the plant size; for example:

Plant Size	Position
Less than 1 MGD**	Plant Manager
Up to 10 MGD	Plant Manager Internship
Up to 30 MGD	Asst. Plant Manager Internship
More than 30 MGD	Shift or Process Supervisor Internship

---

* Refer to the Glossary (page 35) for the indicated words.

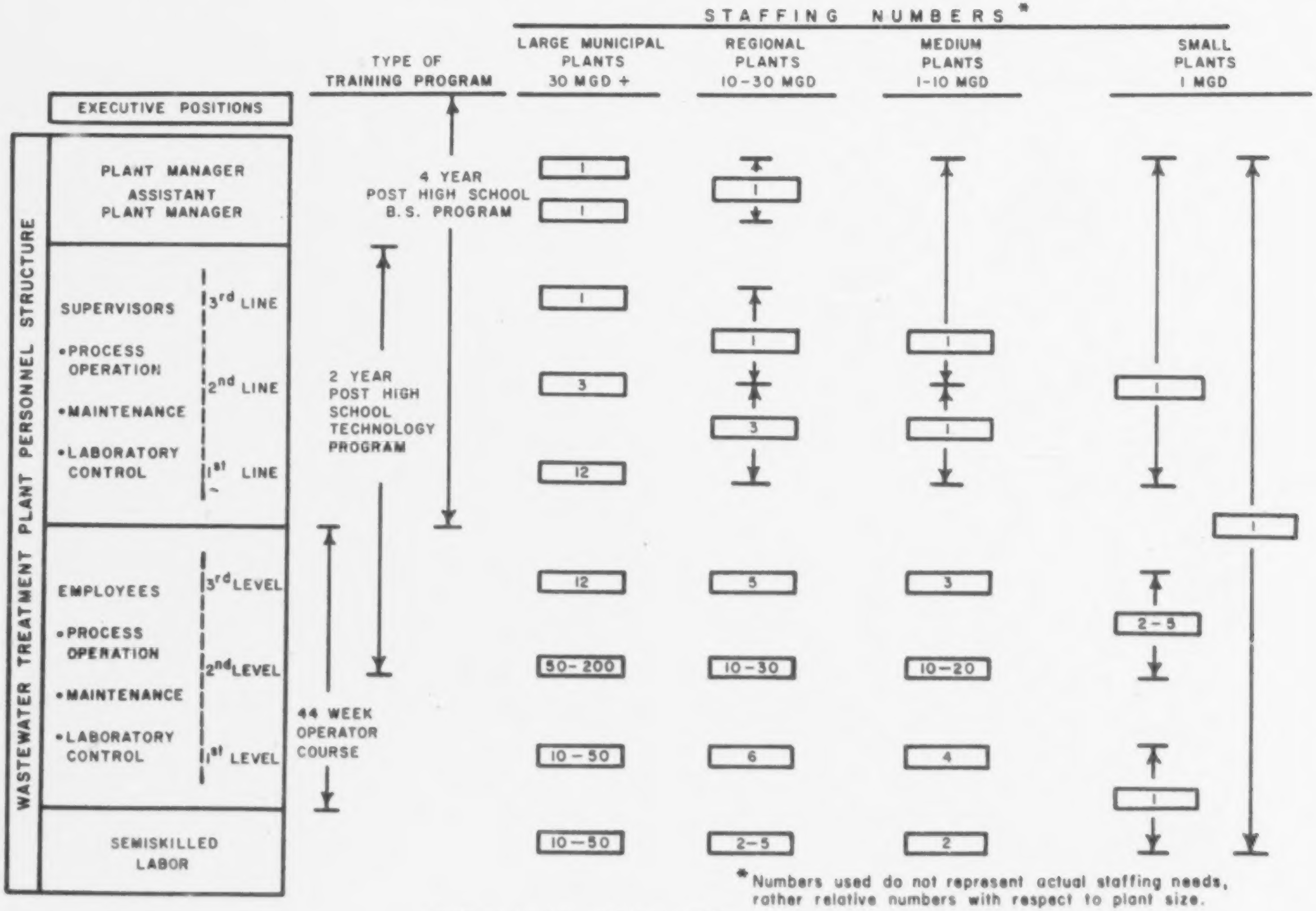
** Million gallons per day

There is nothing inherent in the proposed curriculum that will selectively prepare a trainee for any one of the above positions. Basic personality, personal ambition, geographic preferences, and job availability are factors that will continue to exercise significant influences in the choices and chances of the program graduate. It is enough to expect of the training that it prepare the graduate to perform satisfactorily in the position that is selected.

Although the program graduate may, at the outset of his employment, perform the most basic tasks and serve brief periods in a variety of jobs and at various levels of responsibility, his terms of employment (e.g., title) should clearly indicate his internship (e.g., shift foreman trainee or intern). Remuneration, advancement, and other employment advantages should reflect the special skill and knowledge acquired through the two year post high school wastewater technology training program.

The chart on the opposite page shows the relationship of the subject training program to other training programs at a higher and lower level of skill and knowledge in the wastewater treatment field. The placement of most of the program graduates is indicated and the expected overlaps graphically presented.

RELATIONSHIP OF PLANT SIZE TO TRAINING PROGRAM AND TO STAFF LEVEL AND NUMBER


STAFFING NUMBERS *
TYPE OF TRAINING PROGRAM
LARGE MUNICIPAL PLANTS 30 MGD +
REGIONAL PLANTS 10-30 MGD
MEDIUM PLANTS 1-10 MGD
SMALL PLANTS 1 MGD
EXECUTIVE POSITIONS
WASTEWATER TREATMENT PLANT PERSONNEL STRUCTURE
PLANT MANAGER
ASSISTANT PLANT MANAGER
SUPERVISORS
•PROCESS OPERATION
•MAINTENANCE
•LABORATORY CONTROL
3rd LINE
2nd LINE
1st LINE
EMPLOYEES
•PROCESS OPERATION
•MAINTENANCE
•LABORATORY CONTROL
3rd LEVEL
2nd LEVEL
1st LEVEL
SEMISKILLED LABOR
4 YEAR POST HIGH SCHOOL B.S. PROGRAM
2 YEAR POST HIGH SCHOOL TECHNOLOGY PROGRAM
44 WEEK OPERATOR COURSE
1
1
1
3
12
12
50-200
10-50
10-50
1
1
3
5
10-30
6
2-5
1
1
3
10-20
4
2
1
2-5
1
1

* Numbers used do not represent actual staffing needs, rather relative numbers with respect to plant size.

Developed by Joe Bahnick, Division of Manpower and Training, WQO, EPA

CURRICULUM GUIDELINES
WASTEWATER PLANT OPERATION TRAINING PROGRAM CRITERIA

GLOSSARY

PLEASE NOTE: Words that appear
in quotes within a definition
are themselves defined within
this Glossary.

ABNORMAL OPERATION PROCEDURES. Include those activities of the plant employee that result from abnormal (*unusual* and *undesirable*) conditions of the "wastestream". Abnormal procedures are designed to enable the plant employee to recognize when the wastestream is abnormal and to return it to an acceptable, normal condition. For example, the plant employee should recognize a black, septic influent to the primary settling tank as an abnormal condition of the wastestream, take whatever immediate action is appropriate, if any (e.g., eliminate source of black, septic wastewater to prevent further disruption of downline processes), then determine the cause, correct it and any other adverse effects of the abnormal condition. **NOTE**: Actual cause of septic condition could relate to failure to manually close supernatant valve (resulting from poor "Normal Operation Procedure"), or to malfunctioning of timer switch controlling supernatant valve (leading to a "Corrective Maintenance Procedure"); or to adverse industrial discharge in collection system (resulting from poor "Management/Supervisory Procedures"). ("GENERAL CRITERION BEHAVIORS" 201 and 202 relate to Abnormal Operation Procedures and can be seen in the Appendix of *Volume II*.)

*ALTERNATE (UNIT). Used within the description of the "Composite Model Plant" (CMP) to identify those "Other Units" that may be substituted for "Principal Units" when the latter are not available. In such a case, the Alternate Unit would be given "direct" representation in the curriculum.

BEHAVIOR. "Stimulus/response" interaction(s).

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*For maximum meaningfulness of this definition, first see those for "Unit", "Principal Unit", and "Other Unit".

BEHAVIORAL. Describing what a person's specific "response" should be to a given "stimulus" and the specification of how this basic stimulus/response component relates to other such components of a job (task, etc.).

BEHAVIORAL (TASK) ANALYSIS. The process of determining (and documenting) the "behavioral" components ("stimulus/response") of a job (task, etc.) by observing, analyzing, and/or creating actual or simulated performance of the person(s) involved.

BEHAVIORAL TRAINING OBJECTIVES. The "behavioral" specification of what the performance of a trainee should be after training. An integral part of objectives is the specification of the trainees relevant "pretraining repertory" and the specification of "posttraining performance evaluation conditions and criteria". (Who does what, when, and how well.)

COMPONENT (OF THE EQUIPMENT). Used to designate a distinctive *part* of a "process unit". Whereas the *reciprocating pump* on certain primary sedimentation process units is a component, the impeller on that pump is also referred to as a component.

COMPOSITE MODEL PLANT (CMP). A "verbal" representation of a "wastewater" treatment plant. This plant is a composite plant in the sense that it represents *many* different plants in one model. "Processes" are duplicated and duplicate means for accomplishing each process are indicated. This overall redundancy in the design of the model is directed toward assuring that trainee competence in the "skill" and "knowledge" mastery of *this* composite plant will ensure optimum transfer (generalization) of competency to almost any plant currently in operation. The CMP provides a *concrete* point of reference in deciding what specific skill and knowledge a trainee should acquire in order to have the level of mastery desired. The model is defined in *Volume II: Curriculum Guidelines* by a "Processes Chart" and a number of sheets titled "Specific Process Units". A letter of the alphabet identifies each *process* represented in the Composite Model Plant; each process is further defined by the *specific* "units" of equipment that are used to accomplish, or are related to the accomplishment of, the indicated process.

CORRECTIVE MAINTENANCE PROCEDURES. Include those maintenance activities of the plant employee that usually result from the breakdown and/or malfunction of a "unit" of equipment or a "component" thereof; for example, recognizing the indications of a malfunctioning timer switch on the supernatant valve serving the return line to the primary settling tank and knowing when and how to correct the disorder, or when and how to refer the problem to plant or contract maintenance personnel. ("GENERAL CRITERION BEHAVIORS" 401 - 403 relate to Corrective Maintenance Procedures and can be seen in the Appendix of *Volume II*.)

COVERT BEHAVIOR. "Behavior" in which the "response" (and usually the "stimulus") is *not* directly perceivable: e.g., thinking.

CRITERION. A standard by which to judge; a goal to achieve.

DIRECT (REPRESENTATION IN CURRICULUM). Indicating that the curriculum must be designed and implemented so as to ensure the same kind of practical, hands-on experience--"skill" and "knowledge"--a man would receive working in an actual plant. (Quality instruction in plant is assumed.)

GENERAL CRITERION BEHAVIOR. A comprehensive statement that defines "behaviorally" and "operationally" the general "skill" and "knowledge" desired of a trainee *after* training.

GENERAL CRITERION BEHAVIOR CATEGORIES. The seven groupings within which the thirty-seven individual "General Criterion Behaviors" are organized. The categories are *not* necessarily intended to represent the apparent grouping of behaviors in the actual operation of a plant; rather, the categories represent groupings of similar, related behaviors for ease in analysis and for brevity in documentation. The names of the categories are: "Normal Operation Procedures", "Abnormal Operation Procedures", "Preventive Maintenance Procedures", "Corrective Maintenance Procedures", "Laboratory Control Procedures", "Systems Interaction Procedures", and "Management/ Supervisory Procedures".

INDIRECT (REPRESENTATION IN CURRICULUM). Indicating that the curriculum must be designed and implemented so as to ensure an ability in the trainee to "verbally" relate certain aspects of "Other Units" to "Principal Units"--i.e., be able to say how they are similar and/or different functionally and/or mechanically.

INDIVIDUALIZED INSTRUCTION. Instruction that is represented by at least one, preferably both, of the following characteristics: (1) selective assignment of instruction to the trainee according to individual need is facilitated by pre- and posttesting, and (2) the trainee is permitted to learn at his own pace. Where necessary, instruction may be presented to a group (which would minimize self-paced learning), but the first characteristic must not be violated. All instruction should maximize the active involvement of the trainee by having him frequently answer questions, solve problems, and react to the information he is currently learning. The trainee must be provided prompt feedback regarding the correctness of his responses. Instruction should be modularized to facilitate individualizing a trainee's learning experiences, and all increments of instruction should be sized and sequenced to ensure the trainee's smooth and confident transition from the known to the unknown. Individualized instruction includes, but is not restricted to, instruction often referred to as "programmed".

IN-PLANT INSTRUCTION. Used to indicate a continuation of formal training as a trainee moves from the classroom/lab context into an actual, functioning facility. A high degree of structure is implied: detailed lesson plans will be employed, with specific performance objectives, and practical trainee testing procedures. Certified instructor/operators will be assigned to coordinate and supervise in-plant instruction as a primary part of their duties. Instruction (learning) is of primary concern in an in-plant instruction program--productive employment is a secondary factor.

KNOWLEDGE. That which is conveyed by an individual when "verbally" describing a job (task, etc.) or some related aspect of it. Related "skill" is not necessarily implied by "knowledge".

LABORATORY CONTROL PROCEDURES. Include those special and routine activities of the plant employee relating to laboratory analyses, the specification of sampling procedures and locations, and the general management of the laboratory facilities; for example, determining DO, determining the sample and analysis required for a given condition of the "wastestream". ("GENERAL CRITERION BEHAVIORS" 501 - 503 relate to Laboratory Control Procedures and can be seen in the Appendix of *Volume II.*)

MANAGEMENT/SUPERVISORY PROCEDURES. Include activities of the plant employee relating to employment practices, record keeping, plant operation policy, and the establishment of a constructive and realistic rapport between the plant and the community it serves. ("GENERAL CRITERION BEHAVIORS" 701 - 717 relate to Management/Supervisory Procedures and can be seen in the Appendix of *Volume II.*)

*NONALTERNATE (UNIT). Used within the description of the "Composite Model Plant" (CMP) to identify those "Other "Units that can *not* be substituted for "Principal Units".

NORMAL OPERATION PROCEDURES. Include those *routine* operating activities of the plant employee that do not vary significantly from day-to-day, and that are designed to *keep* the plant functioning within a normal range of values; for example, *routine* sampling at standard locations, *routine* inspections of equipment and "wastestream" to verify that the process is functioning properly, *routine* opening and closing of supernatant valve in return line to primary settling tank. ("GENERAL CRITERION BEHAVIORS" 101 and 102 relate to Normal Operation Procedures and can be seen in the Appendix of *Volume II.*)

OPERATIONAL. Describing the extent to which "behavior" ("skill" or "knowledge") is relevant (essential) to the performance of a job (task, etc.). In order for "skill" or "knowledge" to be considered operational, an acceptably trained person must be able to demonstrate ("overtly" and/or "covertly") its direct application in accomplishing his job within *reasonable* limits imposed by *upper* and *lower* standards of performance. NOTE: It is *unreasonable* to train for rarely occurring circumstances or for obtuse or hypothetical conditions.

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*For maximum meaningfulness of this definition, first see those for "Unit", "Principal Unit", "Other Unit", and "Alternate Unit".

*OTHER (UNIT). Used within the description of the "Composite Model Plant" (CMP) to identify those "process units" that will be "indirectly" represented in the curriculum. Essentially, this means ensuring that the trainee can "verbally" relate Other Units to "Principal Units"--i.e., can say how they are similar and/or different functionally and/or mechanically. (See "GENERAL CRITERION BEHAVIOR" 607, shown in the Appendix of *Volume II.*)

OVERT BEHAVIOR. "Behavior" in which the "response" (and usually the "stimulus") is directly perceivable (can see it, hear it, etc.): e.g., talking, manipulating switches, writing, etc.

POSTTRAINING PERFORMANCE (BEHAVIOR). The trainee's application of relevant "behavior" after training (total or any portion thereof); this may include his "verbally" responding to verbal stimuli (e.g., questions, commands) as well as that "skill" including the hands-on behavior.

POSTTRAINING PERFORMANCE EVALUATION CONDITIONS AND CRITERIA. A description of the conditions under which "posttraining performance" is to be evaluated and the "criteria" are to be applied. Minimally, the description must make explicit the types of questions to be used, the testing environments to be used, the testing devices to be used, and the degrees (quantitative and qualitative) of completeness desired.

PRETRAINING REPERTORY. Used to designate the catagory of relevant experience ("knowledge" and "skill") that a trainee has before training. This prior experience should be excluded from explicit treatment in training;

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*For maximum meaningfulness of this definition, first see those for "Unit" and "Principal Unit".

if so, it must be stipulated as prerequisite knowledge and skill as appropriate.

PREVENTIVE MAINTENANCE PROCEDURES. Include those *routine* maintenance activities of the plant employee designed to *forestall* or *prevent* major equipment breakdown and subsequent corrective maintenance; for example, lubrication of bearings and other moving parts, replacing air and oil filters, *routine* replacement and/or adjustment of certain worn components. ("GENERAL CRITERION BEHAVIORS" 301 and 302 relate to Preventive Maintenance Procedures and can be seen in the Appendix of *Volume II*.)

*PRINCIPAL (UNIT). Used within the description of the "Composite Model Plant" (CMP) to identify those "process units" that will be "directly" represented in the curriculum. That is, with respect to the Principal Unit, the curriculum must be designed and implemented so as to ensure the same kind of practical, hands-on experience--"skill" and "knowledge"--a man would receive working with the actual process units, in an actual plant. (Quality instruction in plant is assumed.) Also, a Principal Unit is that specific process unit, which when mastered by the trainee, will *best* enable the trainee to operate *most* other units, *not* directly represented in the curriculum, but used to accomplish the subject process.

PROCESS. A physical, chemical, and/or biological interaction through which the "wastestream" is modified (treated).

PROCESS VARIATION. Variations in any "process" wherein the same "unit" (or "components" thereof) is used, but the way in which it is used is varied, or the way in which it processes the "wastestream" is varied. For instance, the same basic unit is used for aeration for a number of process variations of the aeration process, e.g., extended aeration, tapered aeration, conventional aeration, etc.

PROCESS UNIT. See "Process" and "Unit".

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*For maximum meaningfulness of this definition, first see the definition for "Unit".

PROCESSES CHART. A simple listing of the "processes" represented in the "Composite Model Plant", showing the letter of the alphabet used to identify each process.

RECALL. Refers to the ability of a person to "construct" or "compose", in part or in whole as required, primarily from memory, the appropriate "response" or "stimulus".

RECOGNIZE. Refers to the ability of a person to pick from among possible explicit alternatives the appropriate "response" or "stimulus".

REFERENCE TOOL. A device (documentation, etc.) that is used concurrently with, or as a part of, the performance of some job (procedure, task, etc.). The purpose of the reference tool is to provide information and/or instruction that the person involved is not normally expected to "know" from "recall". Reference tools, depending on their design purpose, may be brief and general in content or highly specific and detailed. Reference tools include parts catalogs and equipment specifications (including line drawings) that indicate *how the equipment works* and performance guides that indicate *how to work the equipment.* Reference tools may be in many forms: on separate pieces of cardstock, on pages in a book, on film for projection, on audiotape, on an engraved plate attached to a piece of equipment.

RESPONSE. The "overt" (manipulate, talk, etc.) or "covert" (think, realize, etc.) reaction of a person when confronted by an appropriate "stimulus".

RESPONSE DETAIL. An element of the "Specific Behavior Sheets". The Response Detail provides a maximum of additional information with a minimum of documentation. It may provide some actual content of instruction and "posttraining performance"; of greater importance, however, the Response Detail will provide, by implication, a more specific indication of the level and content of training.

SKILL. That which is conveyed by an individual when actually *doing* a job (task, etc.) properly. Usually implies a certain degree of "knowledge" also.

NOTE: Although "verbal behavior" is usually the mode for expressing "knowledge", verbal behavior is often a necessary part of skill; e.g., the ability to issue a proper oral command, or the ability to communicate on radio, or the ability to fill out (write) a sales slip.

SPECIFIC BEHAVIOR SHEETS. The basic data sheet for the *Curriculum Guidelines*. A sheet will contain the full statement of one of the thirty-seven "General Criterion Behaviors"; in most cases, it will contain a very specific material object of the subject "behavior" (e.g., the description of a specific "process unit"); and it will contain more explicit information ("Stimulus Detail" and "Response Detail") about what is implied by the general statement of the subject behavior.

SPECIFIC PROCESS UNITS SHEETS. The basic data sheet for the "Composite Model Plant" (CMP); a sheet will contain a listing of the several different "units" of equipment that may be used to accomplish one of the standard "processes" represented in the CMP. The "process units" listed on a sheet are grouped into "Principal" and "Other" ("Alternate" and "Nonalternate").

STIMULUS. An "overt" or "covert" condition, circumstance, indication, substance, reaction, awareness, etc. that becomes the unique *occasion* for a person's "response".

STIMULUS DETAIL. An element of the "Specific Behavior Sheets". The Stimulus Detail provides a maximum of additional information with a minimum of documentation. It may provide some actual content of instruction and "posttraining performance"; of greater importance, however, the Stimulus Detail will provide, by implication, a more specific indication of the level and content of training.

SYSTEMS INTERACTION PROCEDURES. Include those activities of the plant employee concerned with relating the functioning of specific "units" of equipment to other "process units" and to the system as a whole, relating specific processes to other processes and to the system as a whole, and relating the plant to the community which it serves; for example, determining how the effective functioning of the grit removal process relates to other processes and the equipment involved, determining the desired characteristics of a plant for a given community. ("GENERAL CRITERION BEHAVIORS" 601 - 606 relate to Systems Interaction Procedures and can be seen in the Appendix of *Volume II.*)

TRAINING SYSTEM. One of several sub-systems which constitute the total management system. A training system is one with specific *functional unity* whose product is trained personnel and whose systematic process is directed and controlled by standardized concepts and techniques. Essential to the maintenance of an effective Training System is the development and use of "Behavioral Training Objectives" at a level of detail and "operational" relevancy that permits their use in course development, in course evaluation, in trainee selection and classification, and in evaluation of trainee's "posttraining performance".

UNIT. A specific piece of equipment, or a combination of equipment, that serves to accomplish one of the standard "wastewater" treatment plant "processes" represented in the "Composite Model Plant" (CMP). Rather than being identified by a *full* description of all salient characteristics, the *total* unit is defined by one or more very distinct and selective mechanical or functional characteristics; for example . . .

> "rectangular unit with telescopic valve draw off,
> density meter timeclock, and trough with scraper"

characterizes a *total* process unit used to accomplish the primary sedimentation process as represented in the CMP.

VERBAL. That which is either oral (spoken) or written.

VERBAL BEHAVIOR. Consisting of either or both of oral or written "stimuli" and/or "responses".

WASTESTREAM. The influent or effluent from any "process unit" of a "wastewater" treatment plant. This includes liquids as well as solids; for example: raw wastewater, treated effluent, screenings, grit, recycled flow from secondary clarifier, digester sludge, vacuum filter sludge, or drying bed sludge. (Compare with "wastewater": Within the collection system, the two terms are synonymous; once within the treatment plant proper, only the term wastestream is appropriate.)

WASTEWATER. The used water of a community, including the domestic, commercial, and industrial liquid wastes and the ground, surface, and storm water. (Compare with "wastestream": Within the collection system, the two terms are synonymous; once within the treatment plant proper, only the term wastestream is appropriate.)